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THE IRON TRADE REVIEW

A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

VOLUME XXXVII CLEVELAND, OHIO, AUGUST 25, 1904 NUMBER 34

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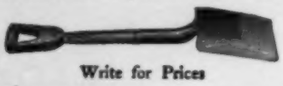

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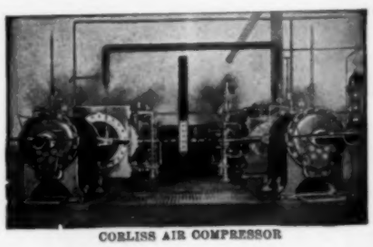

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THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, AUGUST 25, 1904 NUMBER 34

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The uncertainty overhanging the iron market has filled the week with rumors of cut prices and of pool dissolutions, but with all the commotion the status has remained practically unchanged. Sweeping statements have been telegraphed, to the effect that an open market is at hand in pool products, but it does not appear that any steel company has yet taken so radical a step. Conferences have been in progress at New York in the past two days, particularly affecting the plate and structural agreements, and it is intimated that these will be continued though on a lower basis. The co-operation of the Lackawanna Steel Co. is sought, and it is believed it will either join the association or adhere to its prices. Further negotiations among important producers are still in progress. Meantime there are reports of considerable concessions on a recent sale of ship plates, and there are parties to the plate agreement who have presented to their associates the alternative of an open market or such a reduction in the agreed price as will stimulate vessel-building.

The reductions of $4 a ton in wire nails and as high as $7 a ton in wire products have called special attention to the competition in that part of the market, and the independent producer at Pittsburg has not only met these reductions as they apply to jobbers but has made them applicable to mixed carload orders for retailers, this amounting to a further cut of $1. An effort is now being made to secure an adjustment of wire prices, but its success seems problematical.

The entire trade has been in turmoil over recent developments, and naturally buyers withhold orders except for urgently needed material. The concessions for some time made on plates are still heard of, and the amount of business taken by large structural interests at figures plainly based on less than the agreed price, is a continued menace to peace in the beam pool. The talk of lower prices on steel bars in consequence of the cuts in billets is founded on nothing definite as yet. Current specifications in steel bars are on old contracts taken at 1.30c, while the agreed price is 1.35c.

Noteworthy business of the week is in rails and structural material. Orders for rails total 125,000 tons, the largest week's business in months. The Canadian Pacific bought 60,000 tons for its Temiscamingue Road, the branch to be built from Toronto westward. The balance of the tonnage was for Southwestern roads, and the greater portion of it goes to the South Chicago mill, which will be kept busy for nearly all the balance of the year. The long-pending contract for steel for the South Side Elevated Road at Chicago was taken by the American Bridge Co. and amounts to 30,000 tons, including the extension that is to be built later. There was keen competition and the price was low. Several thousand tons of structural steel was placed at New York and fully 15,000 tons is pending there. Pittsburg reports new structural business for rolling mill construction and a P. & L. E. bridge, with the Wabash freight depot and the addition to the B. & O. depot at Baltimore (2,000 tons of steel) soon to come out. Some steel car business is reported, a total of 1,600 cars in the week, calling for 16,000 tons of plates.

The pig iron market has been entirely secondary the past week to developments in finished material. Rather less is doing in foundry iron, and Northern furnaces are taking most of the business, though Southern irons are sought as a necessary part of mixtures, 10,000 tons of Southern brands for Michigan delivery being sold in the week. The $9.25 Birmingham price is still quoted by one producer. Northern furnaces are a trifle firmer perhaps. Ferro-manganese has sold at $41 for 80 percent, the lowest price in years, and the result of English competition. Six Steel Corporation blast furnaces have resumed within the week or are preparing to go in. These and other additions to the active list will give a larger pig iron output in August than that of July.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Aug. 24.

The first session of the most important conference of leading steel interests this year was held in New York yesterday. Whatever action is taken at these meetings will be of utmost interest to consumers of finished materials, and if reductions are made all along the line, it is generally believed active buying will follow, and that it may prove the turning point in the direction of better trade conditions. Numerous matters are under consideration. The conversion contract taken by the Republic Iron & Steel Co. has been a bone of contention in the billet association, but it is believed an amicable adjustment of this matter can be reached. A new and more binding agreement among the steel producers is under discussion, and a reduction of the official prices is expected. The Lackawanna Steel Co. will also again be invited to become a member of the plate and structural pools, but if the invitation is declined, there is no way that this agreement can be continued. Any reduction in the price of billets will also be followed by a corresponding reduction in steel bars, but the agreement on the latter has been pretty firmly adhered to by all the mills and no trouble is looked for in continuing this agreement. On plates it is reported that one mill has been taking business the past ten days regardless of price, and unless some more binding agreement is reached than now exists, an open market can be looked for. On structural shapes a new agreement is also demanded by some of the mills. They contend that producers of structural shapes having their own fitting departments have been in position to take business below the quotations named by structural fitters who are compelled to buy their material from outside mills, and while the labor costs for the fitting is practically the same in both instances, the lower quotations named by the fabricators is based on a price below the official on structural shapes.

The American Bridge Co. has been awarded the contract for furnishing the structural material for the South Side Elevated in Chicago, amounting to 30,000 tons, and a fair tonnage has also been placed in this district, with more business pending which will be closed in the near future. Steel car orders have also been heavy, the Wabash placing one order for 500 cars with the Standard Steel Car Co., and another with the American Car & Foundry Co. for 1,000 cars. The Jones & Laughlin Steel Co. has also purchased 100 steel coke cars from the Amer-

ican Car & Foundry Co. About 16,000 tons of plates will be required in their construction. In other lines the market continues quiet, and the reduced prices on wire products are already being shaded. While the reductions announced by the American Steel & Wire Co. were supposed to apply only to recognized jobbers, they must now be made to other consumers owing to the announcement made by the Pittsburg Steel Co. that it would accept orders for mixed car lots on the same basis as that announced by the largest producer on straight carloads to jobbers.

This week the Amalgamated Association declared a strike on at the Youngstown district mills of the American Steel Hoop department of the Carnegie Steel Co., and efforts to operate the Girard, O., plant are being resisted by the strikers. No effort has yet been made to start the lower plant at Youngstown, although the upper plant is being operated by salaried employes not affected by the scale. The loss of these mills to the Amalgamated Association is a foregone conclusion, so that its only strength in the Steel Corporation will continue at the mills of the American Sheet & Tin Plate Co. Yesterday the conference on the bar iron scale with the Republic Iron & Steel Co. opened at Chicago.

During the week six idle stacks of the Steel Corporation in this and the Valley district resumed operations, and three more are preparing to start. The Bessemer plant of the American Steel & Wire Co. at the Shoenberger works resumed, while the steel plant at Bellaire, O., is preparing to go in. The Shenango steel plant at New Castle is off this week but will resume next Monday.

Pig Iron.—The pig iron market has been extremely quiet during the week, transactions being limited to small lots almost entirely. The market on Northern No. 2 is somewhat stronger than it has been and none of the furnaces in the Valleys are willing to shade $12 at the furnace, although iron from other stacks in this State is offered at $12.65, Pittsburg. The Bessemer iron market is somewhat weaker, and while $12 at the furnace cannot be shaded for extended delivery, small lots for prompt shipment can be had at from 10 to 20 cents below this price. Southern iron for delivery the remainder of the year can now be had on the basis of $9.25, Birmingham for No. 2, the sale of 500 tons having been reported at this price. There have been few transactions in forge iron, which continues to be held on the basis of $12, Pittsburg. Steel Corporation stacks are again resuming, two Bellaire, O., one Edgar Thomson, two Shoenberger, and one Isabella having resumed during the week, while one Sharon, one Clairton and one New Castle are preparing to go in during the next few days. We make the following quotations:

Bessemer, Valley	$11 90 to 12 00
Bessemer, Pittsburg	12 75 to 12 85
No. 1 Foundry	13 00 to 13 25
No. 2 Foundry	12 65 to 12 85
Gray forge, Pittsburg	12 00 to 12 15
Chilled basic, Valley	11 75 to 11 95
Chilled basic, Pittsburg	12 60 to 12 75

Steel.—The billet and sheet bar market has been unusually quiet, consumers being unwilling to place additional orders until the looked-for developments have materialized. Agreed quotations are as follows: Bessemer and openhearth billets, 4 x 4 inches, and slabs up to and including 0.25 carbon, $23 Pittsburg, Wheeling, Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; 0.26 and including 0.60 carbon, $1 advance; and 0.61 to 1.00 carbon, $2 advance. Billets smaller than 3⅞ inches and sheets and tin bars are $1 per ton extra. Bessemer and open-hearth rods are quoted at $28 to $28.50 Pittsburg.

Ferro-Manganese.—Domestic ferro, 80 percent, is held at $41 per ton, delivered at buyer's mill at any point east of the Mississippi. This product is now selling lower than at any time in several years, the low prices being due entirely to the competition of the English producers, who have been meeting every reduction made by the American furnaces.

Spelter.—Prime Western spelter is somewhat weaker and is held at 4.85c, Pittsburg, in carload lots.

Muck Bar.—Muck iron is somewhat firmer, and is held on the basis of $24, Youngstown, or $24.85, Pittsburg. We note the sale of 1,500 tons on the Youngstown basis.

Skelp.—Grooved steel skelp is selling somewhat lower, small sales having been reported during the week on the basis of 1.30c, Pittsburg, and it is believed that this price can be shaded. Sheared steel is held at 1.35c to 1.40c, while grooved iron is held at 1.12½c and sheared at 1.45c to 1.47½c.

Rails and Track Material.—Competition on light rails continues keen, and one sale has been reported that netted the mill only $17.80, Pittsburg. The small rerolling mills are not attempting to meet this competition and the majority of them are closed entirely. One leading steel producer is holding light rails at $23, f. o. b. mill, and will not shade this price. With light rails selling on the basis of $18, Pittsburg, billets at $20 to $21 and standard sections at $28, there is little wonder that consumers have no faith in agreed quotations. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 to 40 pounds, $18 to $20. Track material, spikes, 1.55c to 1.60c.

Plates.—To nll the steel car orders placed during the week no less than 16,000 tons of plates will be required. Other business is light, however, and little new business will be placed until after the present New York conference is ended. We quote as follows: Tank plates, ¼ inch thick, and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.85c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates, more than 10 inches, 5c extra 100 pounds. Plates 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots with 5c extra a hundred pounds for less than carload lots. Terms, net cash in 30 days.

Bars.—The market continues quiet, specifications on steel bars on contracts now in force being lighter than at any time this summer. There is little demand for iron bars, which are selling on the basis of 1.25c, Pittsburg, although one large producer refuses to shade 1.30c. We make the following quotations: Bar iron, 1.25c to 1.30c Pittsburg for local delivery, while for Western shipments quotations are based on 1.25c to 1.35c Pittsburg. Hoops are held at 1.55c base, and bands at 1.35c taking bar extras. Bessemer steel bars, 1.35c; open hearth, 1.40c; plow beams and cultivator beams, 1.35c net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.45c. The following differentials are maintained on steel: Less than 2,000 pounds of a size, not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance.

Sheets.—There is little activity in the sheet trade, and, with bars selling at $24, there is little opportunity to shade the finished product. We make the following quotations: No. 8, 1.60c; No. 9, 1.56c; Nos. 12 to 14, 1.70c; Nos. 15-17, 1.75c to 1.80c; Nos. 18-21, 1.85c to 1.90c; Nos. 22-24, 1.95c; Nos. 25-26, 2c; No. 27, 2.05c; No. 28, 2.10c to 2.15c; No. 29, 2.35c to 2.40c; No. 30, 2.50c to 2.55c. Galvanized: Nos. 12-17, 2.20c to 2.25c; Nos. 18-21, 2.35c to 2.40c; Nos. 22-24, 2.50c to 2.55c; Nos. 25-26, 2.65c to 2.70c; No. 27, 2.90c; No. 28 3.10c; No. 29, 3.45c to 3.50c; No. 30, 3.85c to 3.90c.

Structural Material.—The American Bridge Co. has received the order for structural shapes for the South Side Elevated in Chicago, amounting to 30,000 tons. The contract for the building for the American Seamless Tube Co.'s plant at Monessen has been placed with a local concern, amounting to about 700 tons. The McClintic-Marshall Construction Co. has been awarded a contract for the erection of a bridge for the Pittsburg & Lake Erie Railroad, calling for several hundred tons, while the Wabash railroad will shortly contract for the steel required in the erection of its freight depot. The Baltimore & Ohio Railroad has already contracted for the erection of an addition to its station in Baltimore, although the steel work has not been closed. This work will require about 2,000 tons of material. Agreed quotations are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles, from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Pipes and Tubes.—Demand for merchant pipe is not

heavy, and outside of the line pipe contracts already placed there is little doing. Consumers generally are awaiting further developments in pools, believing that this will affect pipe prices. Discounts to consumers, carload lots f. o. b. Pittsburg, plus freight to destination according to Tube Rate Book, are as follows:

MERCHANT PIPE.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch	70	55	69	54
½ inch	72	62	72	62
¾ to 3 inches	78½	68½	77½	67½
3½ to 6 inches	77	67	76	66
7 to 12 inches	72½	57	71½	56
Extra strong plain ends, ⅛ to 8 inches	69	59	68	58
Double extra strong, ½ to 8 inches	60	50	58	46

MERCHANT BOILER TUBES, LESS CARLOADS, 22 FEET AND UNDER.

	Steel.	Iron.
1 to 1½ inch	48	43
1¾ to 2¼ inches	60	43
2½ inches	62	48
2¾ to 5 inches	65	55
6 to 13 inches	60	48

Wire and Wire Nails.—Reduced prices on wire products announced by the American Steel & Wire Co. have already been followed by concessions announced by the Pittsburg Steel Co., this concern having notified the trade that it will accept orders for mixed carloads at the inside price to recognized jobbers announced by the American Steel & Wire Co. This amounts to a reduction of practically $1 per ton. We make the following quotations: Wire nails, jobbers' carload lots, $1.60; retailers' carloads, $1.65, and less than carloads, $1.75; painted barb wire, $1.75 to jobbers in carloads; retailers' carloads, $1.80, and less than carloads, $1.90, with 30 cents for galvanizing. Annealed smooth fence wire is held at $1.45, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron and steel cut nails are held at $1.65 to $1.70.

Merchant Steel.—Demand for shafting has improved, one large producer having twice the tonnage on his books that he had three months ago. An improved demand for high grade steel is also noted. We make the following quotations: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.55c to 1.60c; plow steel, 6 inches and under, 1.35c for Bessemer and open hearth; plow slabs, ¼ inch and heavier, 1.60c. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

Old Material.—The market generally is somewhat weaker, although dealers are not anxious to meet the lower prices. Heavy melting stock is again on the basis of $11.50, although several large mills refuse to meet this price. The Baltimore & Ohio Railroad Co. disposed of several thousand tons of rails after holding them for two months, this action being due to the reports of impending lower prices for finished material. The Pennsylvania railroad is still holding close to 15,000 tons of rails and refuses to dispose of them at ruling quotations.

Coke.—The coke market is somewhat firmer, none of the Connellsville producers being willing to shade $1.40 for delivery over the remainder of the last half, while $1.35, for prompt shipment on furnace coke can be done only with difficulty. On foundry coke prices range from $1.85 to above $2. During the week ending Saturday, Aug. 13, the production of the upper region amounted to 151,293 tons and the output of the lower was 54,630. More than 11,000 ovens in the two regions continue idle.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Aug. 23.

Considering the many sensational reports that are in circulation, calculated to unsettle buyers, the local market has seen considerable business in the past week. Products were in fair demand, with one or two exceptions, and one large deal was closed up—the contract of the South Side Elevated Railroad Co. for 30,000 tons of structural steel for its extensions. This was let last Friday to the American Bridge Co., which will fabricate the material and erect the structure. It is not known at what price the order was taken, although it will not net the pool a price on plain material after allowing a reasonable margin for the work of fabrication and erection. There are many rumors current that association prices on structural steel are being cut, but there appears to be nothing worse than has been done for some time. One story, which is given with detail, is that a large independent interest in the East is inviting offers on the basis of $1 a ton below association prices; while another is to the effect that the principal manufacturer has been shading agreed prices for some time on lots over 1,000 tons. Much damage has been done by the wide publicity given various reports in the daily press on the cutting of prices. According to these statements, the pool agreements on rails, plates, billets, structural steel, etc., have been disrupted and a long and bitter struggle between the leading producers was imminent. Notwithstanding this drawback, rail makers reported a considerable tonnage placed in heavy rails, the bulk of which went to the local mill. This interest has now sufficient orders on its books to run its rail mill for several months.

Wire products were cut last week by the American Steel & Wire Co. from $4 to $7 a ton, making the price of nails to jobbers 1.75c Chicago. It is reported that a Pittsburg manufacturer is selling to retailers on the same basis that the leading interest is quoting to jobbers, thus shading the latter's schedule $1 a ton. An active demand for wire products has come since the new prices were made public, although producers are insisting on immediate shipment of all orders taken at these quotations. Plates are extremely dull and prices weak. The bar business is in good condition. Specifications to steel mills have been exceptionally good in the past week, the opening up of the fall implement trade developing a round tonnage. Iron bars are firm at 1.35c Chicago, and orders plentiful. Boiler tubes are active and a good demand is also felt for merchant pipe. Billets and wire rods are quiet, consumers apparently waiting for a revision in prices in view of the many reports growing out of the cut in wire products and the conversion deal of the Pittsburg Steel Co. The scrap market is hard to diagnose, for in the face of a declining market on finished material dealers are advancing prices. There is little demand for old material at the present time, and large stocks are being accumulated in local yards. Coke is firm at 1.90c to $2 at the ovens, according to quality.

Pig Iron.—There is little new to report regarding the local situation, interest in the week past having centered largely on finished material. Demand for pig iron shows no material improvement, being nominally good. Some round tonnages were closed up, including one lot of 3,000 tons and several of 1,000 tons each, but practically the whole of this was taken by Northern furnaces. With so slight a difference in the local price of Northern and Southern irons, the latter are at a disadvantage in this market. Aside from those furnaces that have been quoting on the basis of $9.25 Birmingham for No. 2, these sacrificing their differential of 25 cents a ton in the freight rate, a few other furnaces are said now to be willing to consider a good sized tonnage at lower than the generally adopted schedule based on $9.50 for No. 2. Whether the market will hold at its present level will be determined by the movement of prices for Northern irons and the progress in the steel market. At the present time, Southern furnaces are bending their efforts towards breaking the coal miners' strike in the Birmingham district and have instructed their branch offices not to press the trade for orders. Many melters, however, have declined to buy except for pressing needs, pending developments in the general market. We have revised our prices and now quote as follows:

Lake Superior Charcoal	$14 75 to 15 00
Northern Coke Foundry No. 1	14 00 to 14 25
Northern Coke Foundry No. 2	13 50 to 13 75
Northern Coke Foundry No. 3	13 00 to 13 25
Northern Scotch Foundry	14 50 to 15 00
Ohio Strong Softeners No. 1	14 50 to 15 00
Ohio Strong Softeners No. 2	14 00 to 14 50
Southern Coke Foundry No. 1	13 40 to 13 65
Southern Coke Foundry No. 2	12 90 to 13 15
Southern Coke Foundry No. 3	12 65 to 12 90
Southern Coke Foundry No. 4	12 40 to 12 65
Southern No. 1 Soft	13 40 to 13 65
Southern No. 2 Soft	12 90 to 13 15
Southern Gray Forge	12 40 to 12 65
Southern Mottled	12 15 to 12 40
Southern Silveries (4% to 6% Silicon)	14 85 to 15 85
Jackson Co. Silveries (8% to 10% Silicon)	17 80 to 18 30
Alabama and Georgia Car Wheel	18 85 to 19 35
Malleable Bessemer	13 50 to 14 00
Alabama Basic	13 15 to 13 40

Billets.—Little new business has been placed in the past week, the trade generally expecting a revision of prices in

the near future. Though reports are numerous that association prices are not being lived up to, we continue to quote these with the foregoing reservation: Bessemer and open-hearth billets, 4 x 4 and larger, up to .25 carbon, $25; up to and including .60 carbon, $2 extra. Billets, 3⅞-inch and smaller, and sheet and tin bars, $25. Wire rods, $29 to $30 f. o. b. Pittsburg.

Bars.—The opening up of the fall implement trade has resulted in a flow of heavy specifications for steel bars, last week being the best in point of tonnage for some months. Association prices are strong, despite the cutting of a local mill. Iron bars are firm at 1.35c Chicago, and orders for small lots are plentiful. Some improvement to the railroad trade is expected in view of the active demand for cars, contracts for over 4,000 of which were placed with builders in the past week. We quote on carload lots, mill shipments, Chicago delivery, as follows: Bar iron, 1.35c; soft steel bars, 1.40c to 1.51½c; soft steel angles, less than 3 x 3, 1.61½; hoops, 1.71½c. On lots from store, we quote bar iron, 1.75c base, full extras; steel bars, 1.70c to 1.80c base, half extras; hoops, 2.10c rates, full extras.

Sheets.—Demand for both black and galvanized sheets keeps up to good proportions, although the many rumors current regarding the cuts in prices have slightly affected the volume of business for the past week. We continue to quote for one pass, cold rolled, blue annealed sheets, mill shipments, Chicago delivery, as follows: Nos. 9 and 10, 1.77½c to 1.79½c; Nos. 11 and 12, 1.79½c to 1.86½c; Nos. 13 and 14, 1.86½c to 1.91½c; Nos. 15 and 16 1.89½c to 2.01½c. On box annealed, one pass, cold rolled: Nos. 18 and 20, 2.01c to 2.06½c; Nos. 22 and 24, 2.06½c to 2.11½c; Nos. 25 and 26, 2.11½c to 2.16½c; No. 27, 2.16½c to 2.21½c; No. 28, 2.26½c to 2.31½c; No. 29, 2.41½c to 2.46½c; No. 30, 2.51½c to 2.56½c. Jobbers report a fair demand for both black and galvanized sheets from stock. Prices are without change, and we quote as follows: No. 10 and heavier, 2c to 2.10c; No. 12, 2.05c to 2.15c; No. 14, 2.10c to 2.20c; No. 16, 2.20c to 2.30c; No. 18, 2.30c to 2.40c; No. 20, 2.30c to 2.40c; No. 22, 2.35c to 2.45c No. 24, 2.40c to 2.50c; No. 26, 2.50c to 2.60c; No. 27, 2.60c to 2.70c; No. 28, 2.70c to 2.80c; No. 29, 2.85c to 2.95c. Galvanized sheets are quiet, and we quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipments from local store, 75, 10 and 5 to 80 percent.

Structural Steel.—The South Side Elevated Railroad has let the contract for the construction of its extensions to the American Bridge Co. The material needed amounts to 30,000 tons, the bridge company having also contracted for the fabrication and erection of same. It is not known at what price the order was taken at, although reports put it at not higher than 2¾c per pound. Many rumors have been current in the past week regarding the cutting of prices. We continue to quote association prices on carload lots, Chicago delivery, mill shipments, as follows: Beams and channels, 16 inches and under, 1.76½c; 18 inches and over, 1.86½c; universal plates, 1.76½c; angles, 3 x 3 and larger, 1.81½c; zees, 1.76½c. On lots from store, we quote beams, channels and angles, 3 x 3 and larger, 2c; beams, 18, 20 and 24-inch, 10c extra; tees, 2.05c rates.

Plates.—Business has been very quiet during the week under review, and the local mill is rolling plates only part of the time. Prices are weak and reports state the association schedule is being shaded. However, we continue to quote "official" prices on carload lots, mill shipments, Chicago delivery, as follows: Tank steel, ¼-inch and heavier, 1.76½c; flange steel, 1.86¼c; marine, 1.90½c; universal mill plate, 1.76½c to 1.81½c; 3-16-inch, 1.86½c; Nos. 7 and 8, 1.19½c; No. 9, 2.10½c; No. 10, 1.91½c; No. 11, 1.96½c; No. 12, 2.01½c. From store, we quote tank steel ¼-inch and heavier, 2c; 3-16, 2.10c; No. 8, 2.15c; No. 10, 2.15c; flange steel, 2.25c, all f. o. b. warehouse.

Rails and Track Supplies.—Orders for several large lots of standard rails were placed with mills in the past week. The bulk of this tonnage is said to have gone to the local interest, so that this mill has now all the orders it can fill for the balance of the year. Light rails remain weak, less than $20 f. o. b. mill have been done. Track supplies are in good demand, specifications against contracts being very free. We quote, heavy sections, mill shipments, as follows: 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $22 to $24; track supplies, f. o. b. Joliet mill, angle bars, 1.35c; spikes, first quality, 1.65c to 1.75c; track bolts, 3½ x¾, with square nuts, 2.20c to 2.30c per 100 lb.; with hexagon nuts, 2.35c to 2.45c.

Merchant Pipe.—Orders and specifications are of fair volume, and if anything show an improvement over the tonnage taken in recent weeks. Prices are firm and without change. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ inch	68.35	53.35	67.35	52.35
⅜ inch	71.35	61.35	70.35	60.35
½ to 3 inches	76.85	66.85	75.85	65.85
3½ to 6 inches	75.35	65.35	74.35	64.35
7 to 12 inches	70.85	55.35	69.85	54.35

Boiler Tubes.—Jobbers report an improved demand for boiler tubes and a waking up of the trade in general. Some nice contracts have been placed with mills in the past week, but, otherwise, the situation is without material change. We quote carload lots, mill shipments, Chicago delivery, as follows:

BOILER TUBES.

	L. W. Steel. Percent.	C. C. Iron. Percent.	Seamless Steel. Percent.
1 to 1½ inch	46.35	41.35	52.35
1¾ to 2¼ inch	58.35	41.35	40.35
2½ inch	60.35	46.35	43.35
2¾ inch to 5 inch	66.35	53.35	Up to 4 inches. 50.85
6 to 13 inch	58.35	41.35	

The following are the agreed discounts from store, Chicago:

	Steel.	Iron.	Seamless Steel.
1 to 1½ inches	42½	37½	40
1¾ to 2½ inches	52½	35	37½
2½ inches	55	37½	40
2¾ to 5 inches	62½	47½	47½
6 inches and larger	52½	35	..

Merchant Steel.—Further seasons contracts for various of the specialties quoted below have been taken from the agricultural trade in the past week. Specifications are good, and prices firm. We quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 1.90c; sleigh shoe, flat sizes, 1.56½c; concave and convex, 1.76½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.76½c base; smooth finished tire, 1.71½c; plow steel, 2.20c and upward according to quality; toe calk, 2.06½c base. Ordinary grades of crucible tool steel, 6½c to 8c; special tool steel, 12c up. Cold rolled shafting, 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

Cast Iron Pipe.—Makers report that business is of fair proportions, the daily tonnage being made up of small orders. Prices are firm, and we quote 4-inch water pipe, $25.50; 6-inch to 12-inch, $24.50; larger sizes, $24; gas pipe, $1 a ton higher.

Wire Products.—The American Steel & Wire Co. followed the action of the independent producers of wire products at their meeting in this city two weeks ago by a drastic cut in prices, ranging from $4 to $7 a ton, which was announced last week. All materials were cut, with the exception of bale ties and poultry netting, which are unchanged. Wire nails are now selling to jobbers on the basis of 1.60c Pittsburg and to retailers 5c extra, though dispatches state that a Pittsburg manufacturer is selling to retailers on the same basis that the leading interest is quoting to jobbers, which amounts to an extra cut of $1 a ton. The largest manufacturer avers that it is not meeting these prices, and we quote its new schedule on carload lots to jobbers, mill shipments, Chicago delivery, as follows: Wire nails, 1.75c; painted barbed wire, 1.90c; galvanized barbed wire, 2.20c; smooth annealed wire, 1.60c; smooth galvanized wire, 1.90c; polished staples, 1.85c; galvanized staples, 2.15c. Less than carload lots to jobbers are five cents higher than above prices. The retail trade is quoted five cents extra than the foregoing on carload lots, and 10 cents extra on less than carload lots. Bale ties are unchanged at 82½ and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots: Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds. A very brisk demand for all wire materials has followed the announcement of this reduction, though mills are insisting on prompt shipment of all orders taken at the new prices.

Foundry Coke.—Demand is of fair proportions and prices are firm. Good standard 72-hour Connellsville is firm at $2 at the ovens, while the best grades of Southern cokes are held at from 1.90c to $2 at the ovens.

Old Material.—Dealers in scrap have so firm a hold on the local market that in the face of falling prices on both crude and finished material, several have advanced their quotations. Railroads are offering material freely, and although there are large stocks in local yards, the material being offered is eagerly sought after. The large consumers who were in the market last week have generally covered and the outlook has a quiet aspect. We continue to quote dealers' selling prices as follows:

Old iron rails	$15 00 to 16 00
Old steel rails (4 feet and over)	11 00 to 11 50
Old steel rails (less than 4 feet)	10 00 to 10 50
Relaying rails, subject to inspection	21 50 to 22 50
Relaying rails for sidetracks	18 00 to 20 00
Old wheels	11 00 to 12 00
Heavy melting steel	9 50 to 10 00
Mixed country steel	7 00 to 7 50

The following quotations are for net tons:

Low phosphorus scrap (.04 and under)	$12 00 to 13 00
No. 1 R. R. wrought	11 00 to 11 50
No. 2 R. R. wrought	9 50 to 10 00
Shafting	12 50 to 13 00
Dealers' Forge, No. 1	8 00 to 8 50
Wrought pipe and flues	7 50 to 8 00
No. 1 cast, 150 lb. and less	9 50 to 10 00
Heavy cast	8 00 to 8 25
No. 1 mill	6 00 to 6 50
Country sheet	5 00 to 5 50
No. 1 boilers, cut	7 50 to 8 00
Boiler punchings	9 00 to 9 50
Iron car axles	15 00 to 16 00
Steel car axles	13 50 to 14 00
Iron axle turnings	7 00 to 7 50
Steel axle turnings	7 00 to 7 50
Cast borings	4 00 to 4 50
Mixed borings, etc.	4 00 to 4 50
Wrought turnings	7 00 to 7 50
Machine shop turnings	7 00 to 7 50
Railroad malleable	8 25 to 8 75
Agricultural malleable	7 75 to 8 00
Stove plate and light cast scrap	8 00 to 8 50
Old iron splice bars	13 00 to 13 50

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Aug. 24.

Iron Ore.—Sales of non-Bessemers have been fairly active and the quotation of non-Bessemer Mesabis is higher, being usually $2.50, while old range non-Bessemers sell at about $2.70. Bessemer are selling slowly at $3 to $3.25 for old range and $2.75 to $2.80 for Mesabis. Freight rates remain at 65 cents from the head of the lakes, 60 cents from Marquette and 50 cents from Escanaba. Coal has been moving in rather large quantities to the upper lake ports and there has been much delay in unloading, but ore shippers have had no trouble in placing their cargoes. It is not expected that the total ore shipments from upper lake ports for August will be as large as for that month of last year, when 4,104,211 tons were shipped.

Pig Iron.—The market shows more stability than might have been expected, considering the disturbed conditions in finished lines. Some foundries report improved business. While sales have not been large, they are numerous and prices are firm. For No. 2 foundry, $12 at the Valley stacks is the price more generally, although $11.75 can be done on a good order. Local furnaces are selling at $12.25 to $12.50 for home consumption. The demand for basic is stronger. Charcoal pig has also been more in demand, but prices do not advance. Melters of Southern iron continue to buy it in small quantities, although the price $9.25 to $9.50, Birmingham, for No. 2, is above that of Northern irons. We quote as follows for Cleveland delivery:

Bessemer	$12 60 to 12 75
No. 1 Strong Foundry	12 85 to 13 00
No. 2 Strong Foundry	12 60 to 12 85
No. 3 Foundry	12 25 to 12 50
No. 2 Southern	13 10 to 13 35
Gray Forge	12 15 to 12 25
Gray Forge, Southern	12 00 to 12 15
Lake Superior charcoal	14 50 to 15 00

Finished Material.—The discussion of the recent conversion deal has served to show that a larger amount of business than was suspected is ready to be placed when prices become satisfactory. Buyers seem to be eager to come into the market and place orders freely, but are awaiting expected developments. A number of important orders in this city has been held up and business is very quiet. There is no doubt about the smaller producers making concessions freely, but the parties to agreements seem to be adhering to old quotations. Bar iron has settled to 1.25c at the mill and some plants have very few orders ahead, so that it is doubtful whether they will continue in operation. Steel bars at 1.44½c, Cleveland, for Bessemer and 1.49½c for open hearth sell slowly, but specifications against contracts are keeping the mills pretty well supplied. The business in sheets has been more satisfactory in tonnage than in prices, as competition has been keen. The prices of the principal producers through jobbers are as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.74½c; No. 11-12, 1.79½c; No. 14, 1.84½c; No. 16, 1.94½c; No. 27, 2.19½c; No. 28, 2.29½c. Galvanized, mill sales, No. 14, 2.29½c; No. 16, 2.39½c; No. 18-20, 2.54½c; No. 22-24, 2.69½c; No. 25-26, 2.89½c; No. 27, 3.09½c; No. 28, 3.29½c. Black sheets out of stock: ¼-inch, 1.90c; 3-16-inch, 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14, 2.15c; No. 16, 2.25c. One pass cold rolled: No. 18-20, 2.35c; No. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: ¼-inch, 1.90c; 3-16-inch, 2c. Blue annealed, No. 10, stock: No. 16, 2.60c; No. 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Old Material.—The market is stronger, demand having improved for old rails, malleable iron, heavy steel, busheling, iron axles, and stove plate. The volume of business is not, however, large. We quote as follows for Cleveland delivery:

Old iron rails	$15 00 to 15 50
Old steel rails (over 6 feet)	12 00 to 13 00
Old steel rails (under 6 feet)	11 00 to 12 00
Old car wheels	10 00 to 11 00
Steel boiler plate	9 00 to 10 00
Malleable iron (railroad)	10 00 to 10 50
Malleable iron (agricultural)	8 00 to 9 00
Heavy steel	10 00 to 11 00

We quote as follows, net tons:

No. 1 R. R. wrought	$10 00 to 11 00
No. 1 busheling	9 50 to 10 00
No. 1 machine cast	9 50 to 10 50
Iron axles	16 00 to 16 50
Axle turnings	7 00 to 8 00
Wrought turnings (free from cast)	6 00 to 6 50
Grate bars	7 00 to 8 00
Pipes and flues	8 00 to 8 50
Tank iron	7 50 to 8 00
Hoop and band iron	5 00 to 5 50
Sheet iron	4 00 to 5 00
Wrought drillings	6 00 to 6 50
Stove plate	8 00 to 9 00
Steel axles	13 00 to 14 00
Cast borings	3 50 to 4 00

CINCINNATI.

August 23.

The market for coke continues fairly active so far as the foundry grades are concerned. Connellsville district makes are quoted at from $1.75 to $2 f. o. b. ovens. There is an increasing demand for Virginia coke from the furnace interests in the Birmingham district. The ovens in that district have advanced their prices up to $1.45 and $1.50 per ton, which is a rise of about 25 cents from the low prices made at the beginning of the strike in the Birmingham fields. The Birmingham furnaces are now asking for a reduction of 25 cents per ton in the freight rates from the Stonega coke ovens to Birmingham to offset the advance in the market for coke. It is not unlikely that the reduced rate will be made, as the railroads are interested in assisting the furnaces to win in their struggle with the miners. The rate has already been reduced to $1.25 and the rate wanted is $1 per ton. If this is secured it will only be made effective during the strike, but will probably cover specific contracts which may be made for specified periods. The ovens are not willing to sell on contracts that can be canceled at any time by the buyers, and the furnaces will have to take enough coke to justify the ovens to go into operation. It is stated that on contracts the furnaces may make for this coke, that remain unfilled when the strike ends, the furnace interests will sell it on the market and move it to other points. The details of the situation are now under consideration by the parties interested.

Pig Iron.—The volume of business for the past week shows a further slight falling off in general demand as compared with the recent market conditions. Southern irons are still practically out of the race in Central territory, except as they may be wanted for mixtures at a premium over Northern irons. In this connection it is

noted that sales aggregating in the neighborhood of 10,000 tons of Southern irons have been placed in Michigan territory, to be used in mixtures. On some of this iron the deliveries extend into the first quarter of next year. In a general way, while the market is dull, buyers are willing to talk business for deliveries into next vear under the belief that present prices seem to have had about the full extent of decline that may be looked for, and furnaces are not willing to quote with any freedom for future delivery. Prices show but little change and $9.50 Birmingham or No. 2 foundry is the general quotation on Southern iron. If there is still any to be had on the basis of $9.25 it is offered with caution. In Northern iron there seems to be less anxiety to take business to the detriment of prices. Some of the furnaces have advanced their views and are holding firm at $12 for No. 2, while there are still a few quoting on the $11.50 basis; but the tendency seems to be firmer holding even in the face of slow demand. There is an inquiry in the market for about 1,500 tons of Southern iron and 1,000 tons of Northern iron for delivery in Chicago territory, with deliveries extending into the first quarter of next year. The small order business has been rather quiet during the week. We quote in carload lots f. o. b. Cincinnati:

Southern Foundry No. 1	$12 50 to 12 75
Southern Foundry No. 2	12 00 to 12 25
Southern Foundry No. 3	11 50 to 12 00
Southern Foundry No. 4	11 00 to 11 25
Southern Foundry No. 1 soft	12 50 to 12 75
Southern Foundry No. 2 soft	12 00 to 12 25
Gray Forge	11 00 to 11 25
Northern Foundry No. 1	13 15 to 13 65
Northern Foundry No. 2	12 65 to 13 15
Southern car wheel iron	16 25 to 16 50

Finished Material.—The publication of disturbances in the steel and iron trades with reductions in prices on some lines has had the effect of making buyers cautious, and general trade has been only moderately active during the week. An easy tone prevails and some quotations are reduced. Bar iron is quotable at 1.35c. Steel bars are quoted at 1.48c, half extras, with dealers quoting 1.60c to 1.75c for iron and steel out of store. Galvanized sheets are being quoted at 75 and 10 to 75, 5 and 2½ percent off. We quote black sheets, No. 27, at 2.30c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.70c; No. 27, 2.60c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.16c; No. 10, 2.05c. Tank plates are dull and sell out of store at 2c for ¼-inch, 3-16 inch, No. 8 and No. 10. Beams and channels are quoted at 2c from stock and angles at 1.90c to 2c for base sizes.

In merchant pipe trade continues quiet and independent mills are still underselling the schedule of the leading interest. Boiler tubes rule quiet and easy. Car load lots are quoted as follows, f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Guaranteed Wrought Iron Pipe. Black. Percent.	Guaranteed Wrought Iron Pipe. Galv. Percent.
⅛, ¼, ⅜ inch	68.7	53.7	67.7	52.7
½ inch	71.7	61.7	70.7	60.7
¾ to 3 inch, inclusive	77.2	67.2	76.2	66.2
3½ to 6 inch, inclusive	75.7	65.7	74.7	64.7
7 to 12 inch, inclusive	71.2	55.7	70.2	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
to 1½ inch	41.2	37.7
1¾ to 2¼ inch	54.2	36.7
2½ inch	56.7	41.7
2¾ to 5 inch	63.2	49.2
6 to 13 inch	54.2	36.7

Old Material.—There is a slightly better tone to the market, and No. 1 railroad wrought is a shade higher. We quote:

Old No. 1 railroad wrought, net tons	$11 50 to 12 00
Cast machine and foundry, net tons	9 50 to 10 00
Old iron rails, gross tons	12 50 to 13 00
Old steel rails, gross tons	9 50 to 10 00
Old short lengths, gross tons	10 00 to 10 50
Old iron axles, net tons	13 50 to 14 00
Stove plate, net tons	6 00 to 6 50
Wrought turnings, net tons	6 00 to 6 50
Cast borings, net tons	3 00 to 3 50

PHILADELPHIA.

August 23.

The effect of the discussion of the Pittsburg Steel-Republic deal cannot yet accurately be determined, except to say that it has retarded the placing of orders. Actual conditions show little change, but there is keen interest in expected developments. Rumors of cutting of prices are more frequent.

Pig Iron.—There is not much activity, but prices are steady. At the present quotation of Southern iron, $9.50, Birmingham, for No. 2, Northern iron has a slight advantage, but Southern producers show no disposition to change their quotations. We quote as follows:

No. 1 X foundry, $14.75 to $15.25; No. 2 X foundry, $14.25 to $14.50; No. 2 plain foundry, $13.50 to $13.75; standard grey forge, $13 to $13.25; ordinary grey forge, $12.50 to $12.75; basic, $12.75 to $13.

Finished Material.—In spite of all the agitation of the past week, with rumors of dissolution of pools, the market is about the same, although buyers are more cautious. Naturally the feeling is unsettled. We quote as follows:

Beams, channels and angles, 1.72½c to 1.85c, according to specifications, and small angles, 1.50c to 1.55c. Plates, 1.73½c for one-quarter inch, with the usual advance on extras. Bars, 1.43½c to 1.50c, for either steel or refined iron.

Old Material.—A slightly better demand is noticed and prices are somewhat firmer. We quote as follows:

No. 1 steel scrap, $11.50 to $12.00; low phosphorus scrap, $16.00 to $16.50; old steel axles, $14.50 to $15.00; old iron axles, $17.50 to $18.00; old iron rails, $14.00 to $15.00; old car wheels, $11.50 to $12.00; choice railroad No. 1 wrought, $13.50 to $14.00; machinery cast, $11.50 to $12.25; No. 2 light scrap (forge), $9.00 to $9.50; No. 2 light scrap (ordinary), $7.50 to $8.00; axle turnings, $9.00 to $9.50; wrought turnings, $8.50 to $9.00; cast borings, $6.50 to $7.00; stove plate, $9.00 to $9.50; wrought iron pipe, $9.50 to $10.00.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., Aug. 23.

Pig Iron.—The expectation at the opening of the month that it would be a quiet one is being realized. Sales during the week under review were only fair, with Northern irons practically making up the entire amount. Southern makers are not willing to take orders for any large quantities, for forward delivery, pending the outcome of the miners' strike, and for any quantity and for any delivery Northern producers are offering better terms. Southern No. 2 foundry continues to be quoted here at $9.50 Birmingham, but one company is reported at selling at $9.25, though not in this market. The largest sale reported here during the week was for 1,000 tons of Virginia iron. The general run of orders consists of small lots, with unmistakable evidence that consumers are only purchasing to meet current requirements, and are running close to stocks. There are no inquiries in the market for round lots at this writing. The contracts for the East River tunnel castings and pig iron as outlined in *The Iron Trade Review* last week, are regarded as decisive. New York pig iron quotations at tidewater follow: Northern No. 1 X, $14.50 to $15; No. 2 X, $14 to $14.50; No. 2 plain, $13.50 to $14; Southern No. 1 foundry, $13.50 to $13.75; No. 2 foundry, $13 to $13.25; No. 3 foundry, $12.50 to $12.75; No. 4 foundry, $12 to $12.25.

Rails.—No contracts of any importance are reported locally. Current trade is confined to small lots, though it is understood one round lot was closed in the West. Published reports of prospective rail orders from the Pennsylvania Railroad awaken no interest, the general belief being that no one will know anything definite in the matter until the specifications are issued. Standard sections continue $28 at mill.

Finished Iron and Steel.—Reports of utter demoralization in all branches of the finished material market are exaggerated. That the situation is very unsettled admits of no doubt, but that prices have gone sagging to any considerable extent recently cannot be asserted. There is no denying that they have a weak undertone for the time being, and buyers in all lines are acting very cautiously. In structural shapes the feature has been the award to the American Bridge Co. of the contract for the South Side Elevated Railroad at Chicago. The com-

pany intends to make an extension that will require 8,000 tons in addition to the 22,000 tons just taken, but the plans have not even assumed form as yet. The contract was taken at very low figures. The American Bridge Co. also got two contracts aggregating 4,000 tons from the New York, New Haven & Hartford Railroad for bridge work. Outside of these there is nothing of importance to note, except that there is not a single proposition of any consequence for structural work in sight. This is decidedly unusual. In sheets, bars and plates conditions justify only a casual reference, trade in all of them being very quiet, with the near future holding out nothing that is any way promising. New York prices are as follows: Beams and channels, 15-inch and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.35c; sheared steel plates, tank, 1.74½c to 1.80c; flange, 1.84½c to 1.90c; firebox, ordinary, 1.94½c to 2c; refined iron and soft steel bars, 1.49½c; sheets, in carload lots New York, No. 28, black, 2.30c to 2.35c; galvanized, 3.30c to 3.35c.

Old Material.—Several conditions have shown no change from a week ago. In some quarters prices are reported as easier, due to timid holders disposing of some of their possessions. On the other hand, it is claimed that conditions are as strong as they have been for weeks, with the belief that higher prices will prevail showing no abatement. For heavy steel scrap and old steel rails there continues to be a good demand at firm if not at advancing prices. Other material is quiet. Prices per gross ton, f. o. b. cars, follow:

Old iron rails	$14 00 to 14 50
Old steel rails, long lengths	11 75 to 12 50
Old steel rails, short pieces	11 00 to 11 50
Relaying rails	19 00 to 20 00
Old car wheels	11 50 to 12 50
Old iron car axles	17 00 to 18 00
Old steel car axles	14 00 to 14 50
Heavy melting steel scrap	11 50 to 12 00
No. 1 railroad wrought scrap	11 50 to 12 00
Iron track scrap	10 50 to 11 00
Wrought pipe	7 75 to 8 25
Ordinary light iron	4 50 to 5 25
Cast borings	3 50 to 4 00
Wrought turnings	5 50 to 6 00
No. 1 machinery cast	9 00 to 10 00
Stove plate	7 50 to 8 25

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., Aug. 23.

Pig Tin.—There has been a gradual tendency toward lower prices during the past week, which can be charged to very poor trade conditions and heavy arrivals. The general conditions of the market do not hold out much hope for an improvement in the near future. In London the metal during the week has been active, with prices slightly higher than at this time a week ago. Closing prices today follow: Spot, 26.85 to 26.95c; August, 26.82½ to 26.92½c; September, 26.75 to 27.00c. London's closings today follow: Spot, £121 17s 6d; futures, £122 7s 6d. Arrivals for the month to date aggregate 3,455 tons, with 1,525 tons afloat.

Copper.—Trade continues quiet. Many large consumers are reported as having their supply practically exhausted, and the belief that they will soon replenish their stocks is giving the advocates of higher prices some encouragement. The export sales continue to be the one bright feature of the market. London during the week has been fairly active, with prices on a slightly higher level than a week ago. Closing prices today follow: Lake and electrolytic, 12½ to 12¾c; casting, 12¼ to 12½c. London's closings today follow: Spot and futures, £57 7s 6d. Exports for the month to date aggregate 15,161 tons.

Lead.—There has been a slight improvement in prices, spot selling at 4.20 to 4.25c. St. Louis is a trifle stronger at 4.00 to 4.02½c. London declined to £11 13s 9d.

Spelter.—Trade is dull, but prices remain firm at 4.85 to 4.95c. St. Louis is a trifle weaker at 4.72½c. London is stronger at £22 12s 6d.

Antimony.—Both Cookson's and Hallet's are 7.00c asked. Other grades are 6.00c asked.

Quicksilver.—We quote $42.00 per flask of 76½ pounds in lots of 100 flasks. London is £7 15s.

Nickel.—Sales are made at 40c to 47c for large lots down to a ton, and at 50c to 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Aug. 23.

The demand for metals in the week past has been extremely quiet. Prices are practically stationary and without change. We quote as follows:

Lake copper, carloads, 13c, and for smaller lots, 13¼c; casting, 12⅝c for carloads and 13c for less than carload lots. Pig tin has declined a point, and is now quoted at 28¼c to 28¾c, according to quantity. Spelter is easy at 5c to 5¼c in carload lots; sheet zinc is without change at 6c for carload lots of 600-pound casks, and 6.25c to 6.35c for less than carload lots. Pig lead is quoted at 4.10c for 50-ton lots, 4.15c for carload lots and 4.25c for lesser quantities.

Demand for old metal is moderate, though prices are firm. We quote copper wire and heavy, 10¼c; copper bottoms, 9¼c; copper clips, 10c; red brass, 9¼c; red brass borings, 7¼c; yellow brass, heavy, 7c; yellow brass borings, 6c; light brass, 5c; tea lead, 3¼c; zinc, 3.40c.

Eastern Pennsylvania.

HARRISBURG, Pa., Aug. 23.—Conditions in the iron trade in this section reflect an expectation of further cuts and consequent loosening of orders. More men are at work than on the first of the month and unless signs fail there will be business for the fall at some of the larger steel works.

A big reduction has been made by the Pennsylvania Railroad Co. at its shops along its line. At Altoona, where thousands of men are employed, the force has been divided into shifts which only work on alternate days. Here the shop work is greatly reduced.

John Lowber Welsh, who died at Philadelphia on Monday, was a director of the Bethlehem Steel and Cambria Iron and Cambria Steel companies. He was one of the foremost financiers of Eastern Pennsylvania steel companies and was active in the Philadelphia & Reading Coal & Iron Co.

The sale of Gen. E. Burd Grubb's Codorus furnace property in York county recalls that the furnace, which was built in 1770, made cannon balls for the American army in the Revolution. In has been idle for over half a century. James Smith, a signer of the Declaration, was its owner for many years.

Steps are under discussion for the reorganization of the Carpenter Steel Co. at Reading. It is planned to issue half a million dollars worth of bonds and to make a specialty of steel for tools.

The Brooks Iron Co. has started up its nail works after a short suspension.

The Parkersburg Iron Co. has resumed work at its works in Lancaster county after a considerable suspension.

There is some talk among citizens of Boyerstown about establishing a blast furnace. Local ore is to be found there and it is proposed to work for local trade. No definite steps have been taken yet.

It is intimated that the Pennsylvania Railroad Co. will materially reduce its rail order this fall. Ordinarily it is one of the largest of the year, but it is stated that there is a large quantity of rails on hand.

The Lebanon Stove Works, which had been idle for a long time, have resumed.

On his recent visit to the Bethlehem Steel Works Charles M. Schwab is said to have intimated that improvements to increase output were under discussion.

The S. Obermayer Co., of Cincinnati, manufacturer of foundry facings and foundry supplies, secured the order for foundry supplies to be used by the government at the Watertown arsenal at Watertown, Mass., for the ensuing year. This company also has contracts from several United States navy yards for foundry supplies and foundry equipment.

Five of the tin mills of the Shenango plant of the American Sheet & Tin Plate Co., New Castle, Pa., are idle this week.

A BRITISH GUILD TO ADVANCE SCIENCE.

The British Science Guild is now in process of organization in England. The movement is in charge of a committee under the presidency of Sir Norman Lockyer who last year when making the presidential address before the British Association for the Advancement of Science took occasion to recommend the course now under consideration. A larger committee will take the place of the temporary one now in charge of preliminary work, as soon as a sufficient number of replies have been received to the circulars just sent out. These circulars state that "although the contribution of this country to the progress of science has been second to that of no other nation, the English people do not manifest that interest in and belief in the powers of science which are noticeable among the peoples of the Continent or of America. In spite of the efforts of many years, the scientific spirit, essential to all true progress, is still too rare, and, indeed, is often sadly lacking in some of those who are responsible for the proper conduct of many of the nation's activities. It is with the view of attempting to remedy this evil, and to bring home to all classes the necessity of applying scientific treatment to affairs of all kinds, that the proposal is made to bring together those convinced of this necessity by founding the British Science Guild."

The objects of the guild are more specifically stated as follows: To bring together as members of the guild all those throughout the empire interested in science and scientific method, in order, by joint action, to convince the people, by means of publications and meetings, of the necessity of applying the methods of science to all branches of human endeavor, and thus to further the progress and increase the welfare of the empire; to bring before the government the scientific aspects of all matters affecting the national welfare; to promote and extend the application of scientific principles to industrial and general purposes; to promote scientific education by encouraging the support of universities and other institutions where the bounds of science are extended, or where new applications of science are devised.

Idle Steel Corporation Stacks Starting.

Within the past week six idle stacks of the United States Steel Corporation, operated respectively by the Carnegie Steel Co. and the American Steel & Wire Co., resumed operations. At the Isabella plant of the Carnegie Steel Co., Allegheny, furnace No. 3 was blown in last week, and furnace B of the Edgar Thomson plant of the same company was blown in Wednesday of this week. The two idle stacks at the Bellaire, O., plant have also been blown in, and the Bessemer plant at that place is preparing to resume after an idleness of more than a month. The American Steel & Wire Co. is again operating its two Shoenberger furnaces as well as the Bessemer plant at that plant in Pittsburg. At Sharon, Pa., one furnace will start this week, and additional open-hearth furnaces will be placed in operation.

Stack No. 2 of the Clairton, Pa., plant of the Carnegie Steel Co. is preparing to resume next week, and here, too, additional open-hearth furnaces are to be placed in operation. At New Castle the Shenango Bessemer plant is off this week, but will resume next week when one of the rebuilt blast furnaces will be blown in. At Wheeling, W. Va., one of the Riverside stacks started this week after a brief idleness for repairs. This stack is not estimated in the list of those resuming, however, for the reason that it has been operating practically all summer and has not been blown out as a curtailment measure.

River Furnace Co. is Enjoined.

The common pleas court at Cleveland issued a temporary restraining order last week, enjoining the River Furnace & Dock Co. from operating its furnace in such a way as to throw cinders and slag over surrounding territory. Frederick Zimmerman, who operates a picture molding plant near the furnace, is the plaintiff. He sets up that the furnace is ruining his plant and business, imperiling the lives and limbs of his employes and himself. He asks damage to the amount of $25,000. Superintendent McFarland, of the Furnace Co., says that everything possible to prevent the furnace from being a nuisance has been done except to shut down the plant. The hearing was resumed Aug. 23 and Judge Ford announced that he would await the week's evidence before deciding whether the injunction would be made permanent. Mr. McFarland stated to the court that new appliances would permit the operation of the plant without causing damage to property in its vicinity.

Lake Superior Iron Mines.

The docks at Allouez have been compelled to add to their working force and are now handling a large amount of ore daily. The receipts amount to from 12 to 15 trains which run from 25,000 to 40,000 tons of ore. The record of the season promises to be a large one.

Considerable activity now prevails in Eveleth, Minn. At the Adams and Spruce mines 600 cars of ore are being shipped daily.

The Eaton Bros., of Duluth, have sold their one-fourth interest in the forty acres in 4, 58-15 on the Mesaba range to A. M. Miller Jr. The forty contains 3,000,000 tons of high-grade non-Bessemer ore. The other three-fourths interest in the property is owned by A. B. Coates and W. J. Moore, of Virginia, and Max Shapiro, of Eveleth.

The Lincoln mine on the Menominee range has been closed, throwing 350 men out of employment. The order was a great surprise to the local management as well as to the citizens of Virginia. When the mine started up in April it was thought that a shipment of 300,000 tons would be made this year and in order to produce such a large tonnage the mine would be kept very active both day and night until the close of navigation at least. How long the mine will remain closed is not known. The pumps will not be pulled, which is an encouraging sign. It is understood that the ore is running high in silica at present and the managers of the mine have made a purchase of quite a large block of ore that they can use to better advantage than the Lincoln ore.

The Foote Brothers Gear & Machine Co., Chicago, has succeeded to the business of James & Foote, formerly at 58 South Canal street, in that city, the partnership having been dissolved. The new company has bought the good will and machinery of the concern, and is now located at 32 South Clinton street, where it occupies the entire second floor and basement of the building. J. B. Foote, formerly of James & Foote, is president and treasurer of the new company, he having associated with him his two brothers, Bradford and Walter, as secretary and superintendent, respectively. The company will make a specialty of gear cutting, all the members of the firm having had many years' experience in this line of work. In addition, milling machines from the designs patented by Mr. Foote, which have been described in *The Iron Trade Review*, will be made, although the company will confine its efforts largely to the manufacture of gears of all kinds for which it has installed machinery of the latest type.

The W. A. Jones Foundry & Machine Co., Chicago, is building a modern power plant at its shops at North avenue and Noble street. The present boiler house is being enlarged, and a new 60 x 16 tubular boiler added to the former boiler capacity. In addition to this a 125-h. p. Vilter Corliss engine with generator, etc., and a Curtis air compressor is being installed. The company expects in the near future to put in a line of pneumatic tools.

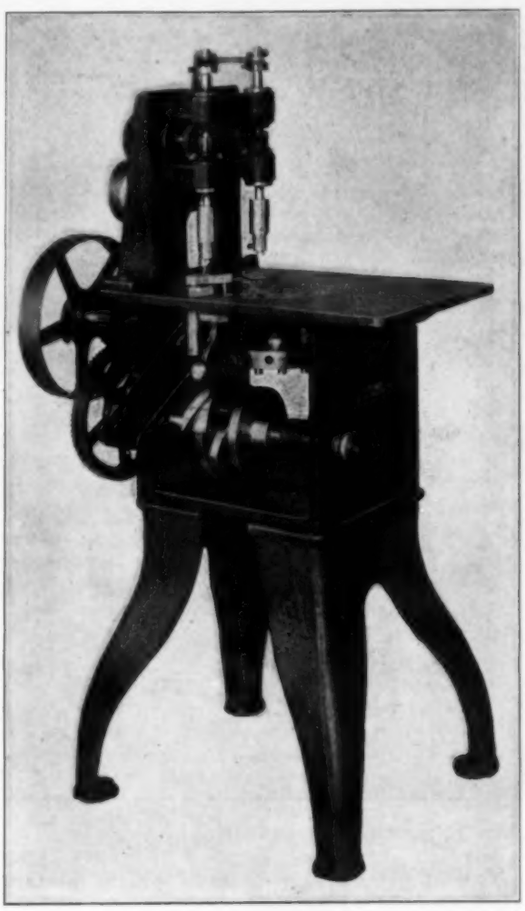
F. N. Armour, for some time in the coke department of the Pittsburg office of Rogers, Brown & Co., as buyer, has arranged with a number of producers in the Connellsville field to handle their coke. Mr. Armour's offices are at Uniontown, Pa., in the center of the region. The following ovens are represented: Mt. Hope, Veteran, Mt. Pleasant, Penn, Chester and Florence.

The Nut & Bolt Association met in New York last week and reaffirmed prices. The members felt that, as there is doubt whether prices of material which they use will be lower, they would not be justified in making any reduction in prices of their product. The Eastern Bar Iron Association also reaffirmed prices.

NUT-TAPPING MACHINES.

A nut-tapping machine has recently been designed and is manufactured by the Western Tool Works, of Chicago. The machine as now built is capable of tapping nuts up to 5-16 inch and all that is necessary is to feed them into the rotating disc. The machine has two spindles and a couple of nuts are tapped simultaneously. The indexing, starting the taps and ejecting the nuts is done automatically and after the nuts are put in the feed disc they require no further attention on their way to the chute and receiving box.

The perforated pieces are fed by hand into cavities cut into a circular disc, which is shown on top of the machine. It is obvious that for different shapes and sizes of nuts a special disc must be employed. The disc on the machine illustrated is ⅛-inch thick, but can be made thicker to suit the shape and size of nuts and is easily changed. The loosening of two screws enables the one disc to be replaced by another. A cam shaft underneath the table operates the indexing device and a cam on the shaft feeds the spindles and taps toward



A NUT TAPPING MACHINE.

and into the work. As soon as the nuts are tapped, the spindles are reversed and pushed upward. When the taps clear the nuts an automatic knockout forces the nuts out of the disc and they are free to fall down the chute into a box. The plate shown projecting over the disc and near the right hand spindle is a stripping plate to prevent the nuts from being pulled out of the disc when the spindles travel up and out of the tapped nuts.

The same firm has also brought out a circular saw which is intended to meet the requirements for cutting the hard materials used in electrical construction work, such as brass, zinc, rubber, fibre, bone, etc. The table is 26 x 21 inches, fitted up with one gauge for slitting and one for cross cutting. The spindle is made of tool steel, runs in hard babbitt-lined bearings, and is supplied with an adjustable thrust collar for taking up wear. The countershaft is a part of the machine, and is furnished with two 6-inch pulleys, tight and loose, and one 12-inch pulley with 2½-inch face. The belt shifting device is on the right-hand side of the machine, handy to the operator and quick in action. A 6-inch saw is furnished with every machine. The speed of countershaft should be 500 revolutions per minute.

Iron Mining in New Jersey.

The Basic mine, near Buttzville, in Warren county, is operated by the Basic Iron Ore Co., of which R. L. Ahles is president and Erskine Hewitt secretary, the office being at Buttzville. The mine is now being developed by three shafts. No. 1 is now 135 feet deep, and levels have been driven 460 feet west on the vein, and 300 feet east, to No. 2 shaft. No. 3 is still further east than No. 2; it is now down 100 feet, and is to be put down 150 feet further before drifts are started.

The report of the State geologist says that the plan for working this mine is a radical departure from methods heretofore used in New Jersey. The caving system, as used in some mines on the Mesabi range in Minnesota, has been adopted. The three shafts are to go down well to the bottom of the ore deposit. Levels are then driven into the ore, and timbered raises sent to the top of the deposit. The ore is then blocked out in 28-foot parallelopipeds. Starting from the top a block is carved down to the main level and taken up the main shaft, and so on, always working from the top down. The overburden of glacial drift is then allowed to fall in, being kept from the ore by planking. This method saves an immense amount of timber, and allows all the ore to be removed. In this mine, with its heavy overburden of glacial debris and soft ore, this method can probably be worked to advantage.

The Ahles ore is markedly different in appearance from the greater proportion of the iron ore mined in New Jersey, which is compact magnetite with more or less pyrite through it. The ore from the Washington mine, which is near the Ahles mine, carries about 5 percent sulphur, which is removed by roasting. The Ahles ore contains practically no sulphur, and further differs from the Washington ore in a high water content, over 10 percent, and is loosely pulverulent. It is in reality a mixture of magnetite and limonite. The following analysis furnished by the producers, illustrate the possible alterations and hydration:

	Washington.	Ahles.
Silica	10.18	10.72
Iron	59.54	46.00
Sulphur	4.00	nil
Manganese	0.07	4.00
Phosphorus	0.43	nil
Titanium	0.10	nil
Combined water	nil	10 to 12.00

During the past year the only ore taken from these mines has been that removed in the process of development. This has amounted to some 30,000 tons, of which 20,606 tons were used in Pequest furnace, mixed with ore from Ringwood, N. J. A high-grade pig was produced.—[Engineering and Mining Journal.

The bankruptcy case of Edward L. Harper was taken up in the Federal court at Big Stone Gap, Va., a few days ago, but before the proceedings had gone far, the case was adjourned to Cincinnati to be completed at a later date. Harper, in his petition in bankruptcy, places his liabilities at nearly $1,000,000, while the petition states that his assets consist of nothing except clothing valued at $50.

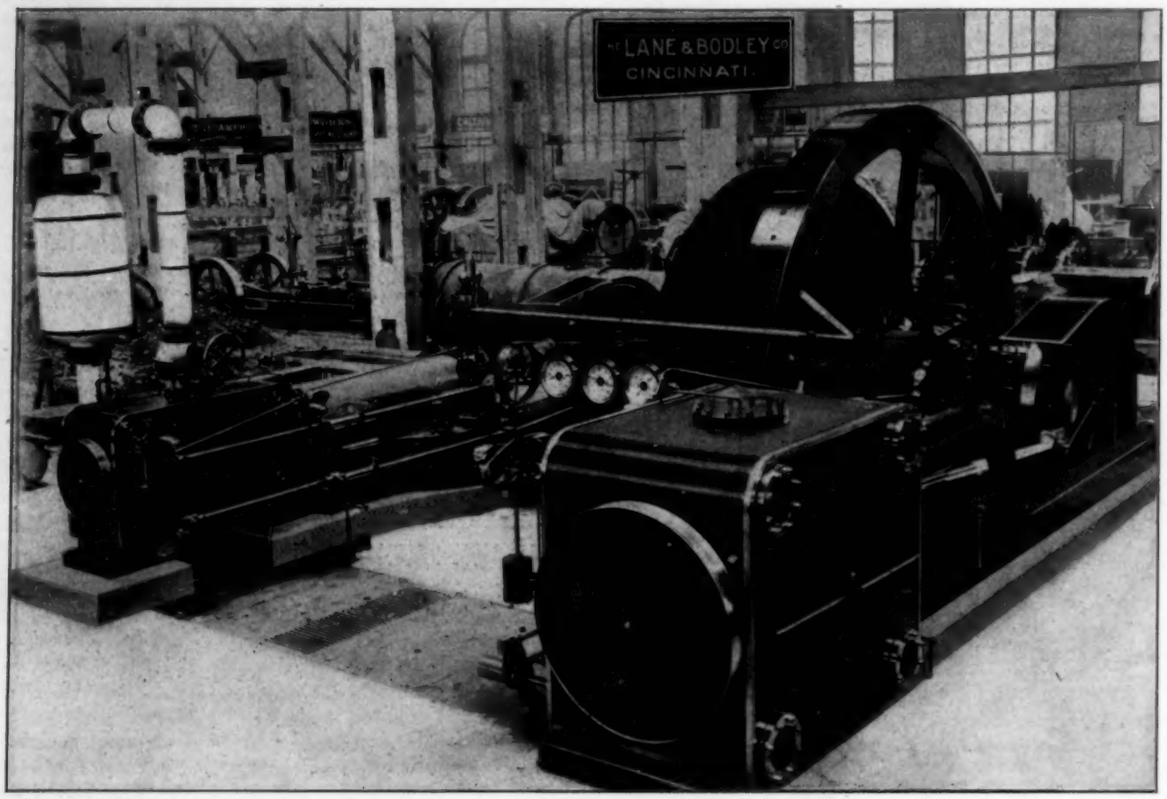
Contrasts in engines are shown in Machinery Hall at the World's Fair. The Allis-Chalmers-Bullock 5,000-h. p. steam-electric unit is the largest ever shown at an exposition. Just across the aisle two small engines, made with an accuracy and finish like clock work, stand in a glass case in the space of the International Steam Pump Co. Each works a direct-connected pump and throws a tiny stream into a copper tank.

The United States Steel Whiffletree Co., Ypsilanti, Mich., has reorganized and elected the following officers: President, Horatio Wigle, Leamington; vice president, A. E. Roach, Leamington; secretary and treasurer, R. M. Wigle, Ypsilanti.

LANE & BODLEY ENGINE AT ST. LOUIS.

One of the seven Intramural railway power units at the Louisiana Purchase Exposition consists of a horizontal cross-compound condensing engine, built by the Lane & Bodley Co., of Cincinnati, direct connected to a 600-kilowatt standard railway type Crocker-Wheeler generator, running at 85 r. p. m.

The engine cylinders are 20 inches and 40 x 54 inches in size, the flywheel is 18 feet in diameter, made in halves, and weighing 60,000 lbs. The frames are of the Lane & Bodley heavy duty type with a bearing the full length of the foundation. The main bearings are 18 x 22 inches in the high pressure frame and 18 x 30 inches in the low pressure frame. The engine is supplied with a high speed, spring loaded governor, and with an auxiliary emergency governor operating a butterfly valve in the throttle valve, in case the speed exceeds 10 percent above the normal. The valve gear is of the Corliss type, double eccentric, and direct acting, without the use of wrist plates. The valves are double ported, requiring small travel.



THE LANE & BODLEY CO.'S EXHIBIT AT ST. LOUIS.

The 1904 releasing gear has no spring for actuating the pick-up mechanism, the forces of inertia and gravity being used instead. All offsets in the line of strain have been reduced to a minimum. The center line of the dash pot coincides with the center line of the steam lever as keyed to the steam valve stem and the center line of the governor cam collar is in line with the center of the governor rod. The valve rod and the parallel rod that actuate the steam valves are side by side on the same pin, making practically a straight line connection.

The generator is a size 673 Crocker-Wheeler 550-volt compound wound machine. The cast iron magnet frame is of the internally flanged type, giving a maximum rigidity, split horizontally and the two sections bolted together on the inside. An extension of the cap plate permits of the whole frame being moved parallel to the shaft, thus affording convenient access to field and armature coils. The field coils are made up in four sections which are individually wrapped, varnished and baked, giving thorough insulation. The sections are separated from one another by small wooden blocks to keep the temperature low. The commutator is constructed of high grade drawn copper with ample surface and wearing depth. Both armature and commutator are well ventilated by their open construction.

The brush rigging is remarkably simple and convenient in form and so substantial in construction that all vibration is eliminated. A rocker-ring, held by brackets bolted to the field frame supports brush-holder arms, these being independently adjustable; and all the brushes can be shifted simultaneously by means of a hand wheel. The brush-holders are of the parallel movement type characteristic of the Crocker-Wheeler apparatus. On each one four sets of laminated copper strips carry the current and control the movement of the brush, always maintaining the same angle with the commutator surface. This causes the brushes to wear evenly, without affecting their position on the commutator. The brush pressure is regulated by a helical spring which, not carrying current, is not subject to heating and a consequent variation of tension. When desired the brushes may be lifted from the commutator and held away from it by the adjusting screw. One of the advantages of this strong and compact brush rigging is that when it is necessary to turn the commutator, a turning tool can be bolted to one of the brush holder brackets, a single row of brush holders being removed for the purpose. Such is the strength of the rocker ring and brackets that the tool is readily supported and the commutator, even on this large machine, can be turned in a few hours.

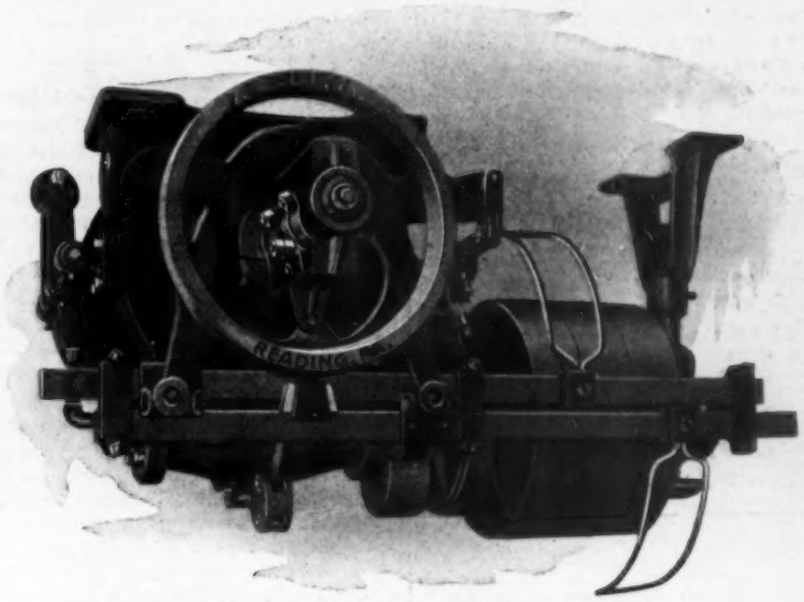
The unit is carefully finished, having in addition to the usual filler, two coats of Patton paint, one of priming and the other a finishing coat, cobalt blue in color. When run under continuous full load for a period of twelve hours the generator does not rise in temperature above the surrounding air more than 35 degrees C. After a continuous run at 50 percent overload for a period of two hours the increase in temperature will not exceed 40 degrees C. The generator will operate at all loads between no load and 25 percent overload or will withstand momentary overloads of 100 percent without injurious sparking.

The International Heater Co., of Utica, N. Y., has sold the Economy Foundry property, at Syracuse, N. Y., to the Central Iron Works Co., of Syracuse. The plant will be reopened for business Sept. 1, after having been idle for sixteen months. It was erected in 1888 at a cost of $40,000 and was sold for $30,000. William H. Brown will be manager of the new company, which will employ about 100 men.

SPEIDEL BELT WINDING MACHINE.

The winding machine shown below is used for elevator and other hoisting service and is arranged for attachment to the ceiling and to be driven by belt power. It is provided with the Hindley worm gearing cut from solid blanks and has large thrust bearings to reduce the friction. The machine is very powerful, being geared 46 to 1 and has 20 x 4-in. belt pulleys. The loose pulleys are provided with self-oiling bushings which can be supplied with lubricant, while the pulleys are in motion. The worm shaft will make 300 revolutions per minute, while the car is speeded to 400 feet per minute. The machine is equipped with automatic stops for the highest and lowest permissible points of car travel. These comprise the usual adjustable clamp collars and a traveling nut working on a screw on the drum shaft. There is also a slack cable stop which comes into action when the car is accidentally stopped in its descent. The cable is then unwinding from the drum while the car stands still. The winding machine will be instantly stopped under these conditions before the cable can be tangled up with any other parts of the mechanism.

The machine illustrated is of one ton capacity; it is also built with single pulley for direct belted drive from a reversible motor and can be furnished as a floor machine for one or two belts. It is made by J. G. Speidel, of Reading, Pa.



IMPROVED WINDING MACHINE FOR BELT-DRIVEN ELEVATORS.

Wheeling Steel & Iron Co.

The new blast furnace of the Wheeling Steel & Iron Co., Martins Ferry, O., is fast nearing completion and will probably be blown in early in October. This stack replaces an old furnace which stood on this site for many years and which was torn down to make room for the more modern iron producer. The stack is 80 x 18 feet, and is provided with three 85-ft. Massick & Crookes hot blast stoves. Power is provided by a battery of Wheeler vertical water tube boilers of 1,500 h. p. capacity. The Top Mill blast furnace of this company was relined early this year and has operated steadily since being blown in. The tube mill of the company is now operated under the supervision of W. B. Williams, formerly connected with the National Tube Co. and the Reading Iron Co. The puddling department at the Benwood plant will resume operations early in September.

New Work of the National Tube Co.

Work on the reconstruction of the National department of the National Tube Works, at McKeesport, Pa., is progressing as rapidly as is possible under the conditions. The work as outlined calls for the rebuilding of almost this entire plant, and to do this and still keep up the tonnage will require no small amount of ingenuity. All of the property lying between the steel works and blast furnaces and the finishing mills, which was purchased last year, has been cleared of the buildings and work on the new construction is going forward rapidly. One of the two blast furnaces, which was practically rebuilt, was recently blown in and the foundation for the third furnace is already in place. At the Bessemer steel works a third converter is being installed and will be ready for operation within a month. This will give the plant three converters and will increase the capacity one-third. An addition to the blowing engine house is now nearing completion and the new engines are already being set up. The power plant will be one of the most complete in the Pittsburg district, a large reservoir being constructed to settle the water before being distributed, and three large pumps with a capacity of 15,000,000 gallons each per day will be shortly in place. Owing to the magnitude of the work it will be several years before the improvements are completed as outlined.

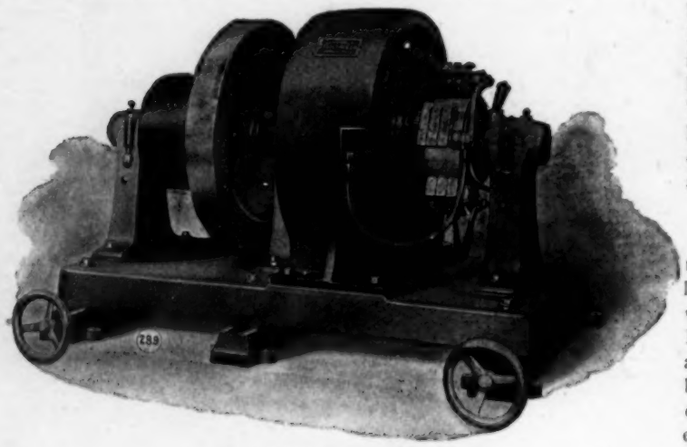
The Colorado Fuel & Iron Co. has executed a 21-year lease for the iron ore deposits of the White Pine district in Gunnison county, Col., the property of the B. W. Lewis estate. This lease means the development of the district. The ore is found to be of high quality. President Hearne says that if the company finds a sufficient quantity and quality of ore, as the samples lead it to expect it will, the mines will be developed to the utmost capacity. The question of building a railroad from the Denver & Rio Grande to the deposits will depend upon the outcome of the prospecting. He says there is no doubt that the ore is of high grade. According to the present estimates, the company will ship one-third of the ore for the Pueblo plant from the White Pine districts and the other two-thirds from the Wyoming district. There will be no diminution of shipments from Wyoming. Senator Charles Dick, of Ohio, owns the May-Mazeppa iron mine, a mile from the properties which the Colorado Fuel & Iron Co. has leased. He is understood to have made an arrangement with the company by which the proposed line of railroad will be extended to his property.

In the United States Circuit Court at Philadelphia last week, Judge Archbald handed down a lengthy opinion in the case of the United States Mitis Co. against the Midvale Steel Co., of Philadelphia. The court holds that the Midvale Co., since 1895, has been infringing on a patent of the Mitis Co. in using the deoxidizing method of converting iron into steel. A master is to be appointed to assess damages. The process was invented by Carl Gustave Wittenstrom, a Swede.

The Union Selling Co., of New York, has filed a petition in the district court of Oklahoma asking for a receiver of the Southwestern Machinery Co., Oklahoma City, Okla.

ELECTRIC GENERATOR WITH FLYWHEEL.

The Commercial Electric Co., of Indianapolis, has brought out a line of direct current generators which are especially designed for use with gas and gasoline engines. For this purpose, on account of the irregular impulses of the engines, it is necessary to overcome any fluctuations in the dynamo speed and produce a steady light, which is impossible where the irregularities of the engine speed are reproduced in the armature of the dynamo. This requirement has sometimes been met by placing a heavy fly wheel upon an extension of the armature shaft, without providing any additional support for this wheel. As standard dynamo bearings are generally not sufficiently heavy to sustain the extra weight of the fly wheel, this method has given but slight satisfaction. In order to satisfactorily overcome these speed fluctuations, without imposing unusual strains upon the dynamo parts, this company has designed special machines having an extra heavy shaft extended to receive a heavy fly wheel and supported by three bearings, two of which are placed close upon either side of the fly wheel, where they will support its weight and receive the extra strain caused by the jerking of the dynamo belt without injurious effect upon the dynamo. The three pedestals, with the machine frame, are mounted upon a heavy iron base, which is carried upon sliding rails with hand wheels and thrust screws, by means of which the belt tension can be adjusted. By this construction the overloading of the dynamo bearings or the expense of an extra countershaft for carrying the fly wheel is avoided, and a substantial machine, capable of producing a steady light, is secured. These machines include all the usual sizes and speeds from ½ to 30 kilowatts.



A NEW BELT-DRIVEN GENERATOR.

An Economical Steam Engine.

The interest at present manifested in the steam economy of prime movers, both of the reciprocating and turbine types, warrants some attention to the results lately obtained in an engine test at the Park Avenue pumping station, Chicago. The engine is of the Worthington, duplex, reciprocating, triple-expansion type, having semirotary steam valves but no flywheel. The latter is replaced by compensating cylinders so arranged that their pistons retard the motion of the main piston during the first part of the stroke, but assist it towards the close, giving a uniform thrust. The pistons of these auxiliary cylinders work against air under pressure from a tank. The engines are vertical and the weight of the pistons, plungers and rods is counterbalanced by another auxiliary balancing plunger, also working through the medium of water against air under pressure. The capacity of the engine is about 22,000,000 gallons per day against a total head of slightly over 121 feet, and 660.9-h. p. were indicated in the test. The duty obtained was 174,735,801 foot pounds per 1,000 lb. of steam used, corresponding to an economy of 11.32 lb. of steam per net horsepower delivered in water lifted, or 10.01 lb. of steam per indicated horsepower. The steam pressure was 144.45 lb. per sq. inch, with 154 degrees F. superheat at the throttle, the steam cylinders being provided with jackets and reheaters. Two other engines of the same design in the Central Park Avenue station and three more in the Springfield Avenue pumping station have all shown under test an economy of steam less than 11 lb., although the economy per delivered horsepower was not as high in the test quoted. These tests were carried out under the supervision of the Bureau of Engineering of the city of Chicago and, together with the engines and the power station, are fully described in a pamphlet distributed by Henry R. Worthington, of New York.

Sale of U. S. Shipbuilding Co. Plants.

Special Master James Smith Jr. will offer for sale on the dates and at the places indicated these plants of the United States Shipbuilding Co.: Sept. 8, 12 m.—Crescent Shipyard Co., Elizabethport, N. J., sale taking place at Elizabethport. Sept. 8, 1 p. m.—Samuel L. Moore & Sons Co., sale taking place at Elizabethport. Sept. 8, 3 p. m.—Canda Mfg. Co., Carteret, N. J., sale taking place at Carteret. Sept. 12, 1:30 p. m.—Eastern Shipbuilding Co., Groton, near New London, Conn., sale being at Groton. Sept. 19, 12 m.—Hyde Windlass Co., Bath, Me., sale taking place at Bath, Me. Sept. 19, 2 p. m.—Bath Iron Works, Ltd., Bath, Me., sale at Bath. Sept. 26, 12 m.—Union Iron Works, San Francisco, Cal., sale at San Francisco.

Brazing Cast Iron.

A process and a compound for brazing cast iron has been patented by Henry F. Hiller, of South Dartmouth, Mass. The process consists in first heating and then cooling the metal and applying to the surfaces a mixture of boracic acid, carbonate of lime, carminic acid and water. This mixture is allowed to dry and the metal is next heated sufficiently to melt a flux and solder consisting of one part of boric acid crystals for the former and brass and copper in chip form for the latter.

Boston's largest department store, controlled by the interests of which Henry Siegel is president, is to have the largest equipment of escalators (moving stairways) in the world. The contract has just been signed with the Otis Elevator Co. for the installation of ten of these modern appliances. There will be two lines of escalators running between the basement and the fifth floor, five up and five down. By means of special mechanism the descending escalators can be reversed and utilized to carry patrons of the store to the upper floors in the extremely busy season.

According to the will of the late Florence C. Sennett, of Youngstown, $10,000 was left to a minor, George Sennett Davey, and the remainder of the estate, including the interest of the deceased in the Geo. B. Sennett Co., is left to Thomas T. Davey and George E. Rose, both of Youngstown. All relatives are expressly excluded from participation in the estate, which is valued at $100,000.

Work on the exploration for iron ore in the vicinity of Iron River will probably commence within the next two weeks if a fund sufficient for the purpose is raised and it is expected that it can be without any trouble. The committee in charge of the work consists of T. F. Mackmiller, James H. Tomlinson, J. A. Pettingill and Edwar J. F. Daniels and an attempt will be made to secure options on the property of A. Doherty and others about a mile and a half northwest of the city. Experts have gone over the Doherty place and adjoining property and they met with the citizens last week and recommended that work be done on the proposition.

The annual meeting of the Colorado Fuel & Iron Co. will be held in Denver this week when it is expected that the reorganization plan will be adopted.

Schedules in bankruptcy of the Fred H. Pell Co., agent for machinery manufacturers at 11 Broadway, show liabilities of $4,374 and nominal assets of $2,281.

Boiler-House Economy.*

BY REGINALD S. DOWNE.

The problem is to deliver a unit of electricity at the station bus-bars, with the minimum number of pounds of coal, and this question is the most difficult one the engineer has to face in the power-house, but the one most likely to give the best money return for the time expended on it. Coal in some cases accounts for 50 percent of the total cost. In a paper read by Mr. A. S. Giles in January last, before the Manchester section of the Institution of Electrical Engineers, a table compiled from data supplied by the chief engineers of a large number of central stations appeared, giving particulars of coal consumption, load-factor, etc. The figures show that non-condensing stations, with moderate load-factor and low-priced slack, consume 6.5 pounds per unit generated, whereas there are condensing stations with similar priced slack and higher load-factor consuming 10 pounds and upwards. Broadly speaking, the only conclusion one can arrive at after carefully studying the table, is that the stations with the largest output and highest load-factor appear to give the best results, and that the other contradictory figures must be due to local or special conditions unknown to engineers.

A central station should be run on a money basis, and all the conditions carefully studied when the lay-out of plant is decided upon. Each separate station has to be dealt with on its merits, and the measure of success is the net saving in the coal bill at the end of the year. The great majority of stations burn bituminous slack, costing from 6s. to 12s. per ton delivered in the bunkers. Where the railway rate is high and smoke conditions stringent, Welsh coal is used; in a few cases where it is available, smudge or low grade fuels are burned. The point is entirely settled by local conditions. Assuming bituminous slack is used, how many pounds ought to be considered the maximum necessary to generate a unit of electricity? In a well-designed condensing station, with economizers and superheaters, and having a load-factor of not less than 15 percent, in the author's opinion, with the experience at present available, it ought not to exceed 5 pounds. This quantity of coal should cover all the losses between the furnace and the engine. Several private industrial plants are now generating a unit of electricity with 3 pounds of cheap slack. No comparison, however, can be made between the coal consumption of private plants and public supply stations, the nature of supply being totally dissimilar. The results obtained are excellent, but under the same favorable conditions one could do better.

Before this problem can be dealt with, it is necessary to know where the losses are taking place. Are they due to low boiler efficiency, steam range losses, excessive steam consumption of engines, or all three? To enable this to be ascertained it is necessary to have a rigid weekly analysis of units generated, together with coal and water used. In most works completed quite recently, provision has been made for these measurements, and it is possible to have a daily analysis which enables a close check to be obtained, and any discrepancies to be immediately looked into. A number of stations of earlier date are not so well provided in this respect. It is, however, possible for all to obtain the weekly consumption of coal, and thereby calculate the pounds of coal per unit generated. The measurement of water, unfortunately, is not such a simple matter; in many cases where the supply is not obtained from the town's mains it is not possible.

The various directions and means through which one may still hope to effect a further reduction in our coal consumption are as follows: (1) The influence of output and load-factor; (2) bonus system for firemen; (3) superheating; (4) mechanical stoking and forced draught; (5) fuel analysis; (6) analysis of flue gases; (7) auxiliary plant; (8) feed water purification and heating; (9) prevention of radiation.

Effect of Output and Load Factor.

The stations having the largest outputs and the highest load-factors show the best coal results. The coal bill of a station in its early stages, before the output has reached a reasonable figure, is often abnormal, owing to its being ready to supply before there is much demand. The conditions are not favorable to economical running, as the fuel required for banking, keeping steam on ranges, etc., is out of proportion to the output. The effect of a bad load-factor is more pronounced in the boiler-house than in the engine-room.

With graduated sizes of units it is possible to run the generating plant in a fairly economical manner. A standing engine does not waste coal. It is generally admitted that under ordinary working conditions the radiation from a boiler amounts to from 5 to 10 percent. If we work a boiler only at half its power the amount of radiation will still be the same, for the steam temperature is not altered, but the ratio of loss by radiation to heat put into the boiler is doubled. It appears, therefore, conclusive that the number of boilers under steam should be kept to the minimum possible, and some method of assisted draught fitted to help us over the peak of the load.

The author thinks it will be admitted that with the class of slack usually burnt, under natural draught, the boiler duty is much lower than the maximum; in many cases the number of boilers under steam could be reduced 25 percent. The station with which the author is connected has Lancashire boilers, and the coal required for lighting and banking fires has been found in the winter months to amount to between 5 and 7 percent of the coal consumed. There was a difference of 2 percent, in economy between banking fires on the 8 foot 6-inch boilers, and allowing fires to die out on the 7-foot boilers, and vice versa. A considerable amount of coal may be saved by finding out what banking conditions are most suited to the boilers at different periods of the year.

Bonus System for Firemen.

The personal factor in the form of the fireman has the greatest influence on the reduction of coal costs, after output and load-factor. In a test quoted by Mr. Bryan Donkin, four good stokers were put to fire the same boiler—a 2-flued 30-foot Lancashire—under the same conditions. There was a difference between the most and least expert of 23 percent in capacity and 18 percent in economy, a saving of £7 to £8 ($34 to $38) per week, with coal at 10s. ($2.50) per ton. All raw material from which there is no valuable by-product passes through the hands of the fireman. As a rule he does his best, i. e., with a fluctuating load he draws a fairly straight line on a recording steam pressure chart. He knows that the less coal he throws on, the less manual labor he is called upon to perform; he may also have a conscientious idea that by economizing coal he is husbanding the national resources. Generally speaking, beyond that he has no incentive to economy, and provided he keeps a steady head of steam is not interfered with. The man who actually burns the coal is the one who can effect the economies.

When the managing engineer has convinced himself that there are no leakages through the brickwork, when the dampers are easily accessible, draught gauges have been fitted to the chimney and each boiler, and a CO_2 recorder has been fixed, he has done all that can possibly be foreseen, and the rest must naturally be left to the leading firemen. A pecuniary incentive is a great help towards reducing the coal bill. If a central station has not reached what it considers its minimum coal consumption, it is worth while paying at at least 2s. (50c) to save 20s. ($5) worth of coal, which it could not otherwise do. It would be interesting to know what results have been obtained by this means. At Southport a coal bonus has been recently introduced, and the following particulars have been added, as they may be of interest to the members:

The present contract price of coal is 7s. ($1.75) per ton, delivered in the bunkers.

The approximate number of units generated per annum = 2,327,600.

The average number of units generated per week = 44,800.

A saving of one-tenth of a pound of coal per unit generated on the average weekly output = 4,480 pounds = 2 tons, worth 14s. ($3.50.)

Per month of four weeks = £2 16s. ($14.)

The bonus is divided amongst the four leading firemen, and is distributed monthly.

*Abstract from a paper read at a recent meeting of the Incorporated Electrical Association of England.

It has been fixed at 1s. (25c) per week per fireman for each tenth of a pound of coal saved, *i.e.*, for every 56s. ($14) worth of coal saved 16s. ($4) or 28.5 percent is given as bonus.

The pounds of coal below which a bonus is given has been fixed for the next financial year at 6.5 pounds for the summer months and 5.5 pounds for the winter months. If we have to pay more for our coal the saving per ton is proportionately greater.

Superheating.

No practical difficulties are experienced by using a moderate superheat up to 500 degrees Fahr. The author has superheaters fitted in the downtakes of all his Lancashire boilers, and has been able, by adding firebrick combustion chambers, to raise the temperature of the steam leaving the superheaters from 80 degrees Fahr. to 150 degrees Fahr. Superheaters fitted in this way give a fairly constant degree of superheat, and require practically no attention. A consideration of the various types of superheaters is outside the scope of this paper; but the author is of opinion that where a high superheat of constant temperature is required (as in pure turbine stations) separately-fired superheaters would be preferable.

The following figures were obtained at Southport on two 8-hour tests carried out on a 250-i. h. p. horizontal Musgrave-Corliss condensing engine, supplied with steam from a 7 x 28-foot hand-fired Lancashire boiler, with and without a Musgrave superheater:-

	Without Superheater	With Superheater	Saving per cent. in favor of Superheater
Water per i. h. p. per hour, lbs.	16.30	13.58	17
Water per unit, lbs.	29.27	24.24	
Coal per i. h. p. per hour, lbs.	1.89	1.60	16
Coal per unit, lbs.	3.40	2.86	

Average superheat at engine, 85° F.

At the time of this test a ring steam range was in use, which has since been discarded; a similar test if taken to-day would not show quite the same saving.

Mechanical Stoking and Forced Draught.

To what extent does mechanical stoking influence the coal consumption in central stations? Makers' tests do not help much, as they are not carried out under every-day conditions. In a large power-house having modern coal-handling plant, mechanical stokers undoubtedly save labor, and where the load-factor is high give economical results. In the class of station under consideration, viz., that having a total plant capacity not exceeding from 4,000 i. h. p. to 5,000 i. h. p., mechanical stokers are usually employed to enable bituminous coal to be burned with a minimum of smoke. Where the coal has to be thrown into the hoppers by hand there is no saving in labor, and it is doubtful whether any economy can be shown over hand-firing when the interest, repairs, and cost of running are taken into account, while on the other hand there may be obvious disadvantages.

With but few exceptions natural draught is depended upon for the combustion of fuel. Is it possible by adding induced or forced draught so to increase the evaporation and economy that after paying all charges there would be a saving that would be worth obtaining? A chimney is a rough-and-ready way of inducing the air to flow into the furnaces with sufficient velocity to cause the fuel to burn; it has the merit of being absolutely reliable and the upkeep is nil. Energy must be expended in bringing the air to the coal, but as a chimney may require 20 percent. of the heat units in the coal, this work may be carried out much more efficiently by other means.

The apparent advantages of forced draught are: (1) The steaming power may be increased 30 to 40 percent without injury; (2) higher temperature of combustion, giving a higher evaporative effect for the fuel; (3) air supply under control.

Perfect combustion is of far more importance, both as regards the efficiency of a boiler and the power to be got out of it, than is—within limits—either the amount of heating surface or its arrangement. The furnaces usually fitted by boilermakers are only suitable for burning anthracite coal or coke. As the majority of boilers burn bituminous coal, the efficiencies are extremely low, but could be raised if the furnaces were designed to suit the class of fuel burned. In a coal containing over 10 percent of volatile hydrocarbon, a high temperature in the combustion chamber (approxim. 1,100 degrees Fahr.) is absolutely necessary for combustion. In most furnaces, when the gases have distilled they immediately come in contact with water-cooled plates, and are reduced in temperature before combustion takes place. Until the temperature of combustion is raised sufficiently high, the thermal efficiencies of boilers burning this class of fuel will remain in the neighborhood of 50 percent.

Fuel Analysis.

It is essential that the quality of the coal used should not be frequently changed, otherwise firemen cannot obtain the best results. How can one ascertain that the quality of coal contracted for is being delivered? Some engineers argue that by buying the cheapest slack obtainable in the district, any deviation from the contract must be in their favor, but this method of procedure cannot always be recommended. Calorimeter tests of small quantities of coal, although fairly comparative, are not of much commercial value, because the thermal value of bituminous fuel is augmented by the hydrocarbons, a large proportion of which escape up the chimney without parting with their heat. The calorific value of some soft bituminous coal is equal to that of hard South Wales coals, but in practice the evaporation is much lower. If we obtain the percentage of moisture under similar weather conditions by drying a known weight of slack, and also ascertain the percentage of ash, it is possible to keep a reasonable check on the deliveries. In the author's opinion, evaporation tests made under similar conditions give the best practical results. Where a contract is placed with a colliery, fewer deviations in quality are to be expected than where supplies are obtained from a coal merchant or colliery agent; where the colliery works only one seam of coal the conditions are even more favorable.

Analysis of Flue Gases.

For a complete analysis of the exit gases from a boiler it is necessary to know their chemical constituents, temperature, and draught. This information enables the engineer to reduce the loss up the chimney to a minimum; apparatus for carrying out these tests is now available. To obtain the greatest boiler efficiency the excess of air must be kept as low as possible, and this can only be ascertained by individual tests, and depends upon the quality of coal and the draught available. Every pound of air which passes through the boiler in excess of the theoretical quantity represents a dead loss, as this air has to be heated up from the temperature of the atmosphere to the temperature of the exit gases. To obtain perfect combustion of the fuel, as much oxygen as possible should combine with the carbon to produce carbonic acid. For practical purposes, the amount of carbonic acid produced is an index to the state of combustion. Under theoretical conditions without excess air, 19 percent CO_2 would be produced, but in every-day work one might with reasonable attention obtain 12 percent CO_2 with an exit temperature of 600 degrees Fahr. The difference between 8 percent and 12 percent CO_2 represents a loss of 8.5 percent of the fuel burned.

Many works have recently fitted up recording apparatus to ascertain this percentage, and in most cases the results have been eminently satisfactory, and have well justified the outlay. It is possible to connect the apparatus to each boiler in turn, and by reducing the air leakages, altering the thickness of fires, etc., to raise the average percentage of CO_2 considerably. When boilers are shut down under natural draught, there is always considerable air leakage into the main flue even when the dampers are closed. Sliding dampers require to be an easy fit in their frames, but in most cases this is overdone; an improvement on the usual type of damper might be easily fitted. The brickwork round damper frames is difficult to inspect; generally on being opened up it is found to pass cold air at every joint. This air has a consid-

erable cooling effect on the gases; it decreases the draught, and lowers the economizer efficiency.

The author has had one form of CO_2 recording apparatus fitted in his boiler-house for the past eight months, and has found it extremely useful. When first installed it was impossible to get more than from 2 to 3 percent CO_2 from certain boilers; on tests he has since obtained 15 to 16 percent as a maximum, but the average daily running works out about 10 percent. Two boilers, even after the brickwork had been thoroughly overhauled, would not give more than 3 percent CO_2. On further investigation being made it was found that there was an opening at the back dead-plates just behind the bridges, measuring 30 x 3 inches; this was a drastic remedy of the boilermakers for smokeless combustion. On bricking up these openings the CO_2 was equal to that given by the other boilers, and they naturally gave a better duty.

Mechanical stokers, economizer scrapers, coal elevators, and ash conveyors are now generally electrically driven. Most stations, however, still have steam feed pumps which are notoriously inefficient, and may require from 2½ to 3½ percent of the steam generated. With a careful sub-division of electrically-driven feed pumps this may be reduced to 1½ percent. The first cost of the pumps is greater, but after meeting all charges there is a distinct saving, and they are as reliable as any other type of feed pump. It is, however, advisable to have a steam pump as stand-by in the event of any local or other failure of the supply.

Feed Water Purification and H a g.

It is now well known that scale does not materially reduce the efficiency of a boiler, but it seriously increases its wear and tear, whereby its life is considerably reduced; it also endangers the safety of boilers. The same remarks apply to coatings of grease due to feeding the boiler with water containing condensed steam from the engine. It is highly desirable to remove every trace of grease from the feed water. This cannot be done by filters; the only efficient method is to add mineral matter in solution to the condensed water, and then cause precipitation by chemical means. In every case where water is treated it should be done externally before entering the boiler. For economical steaming a boiler should be clean inside and out, because the transmission of heat is rendered easier and the evaporation is increased.

It is a generally accepted fact that no economy can be obtained by raising the temperature of feed water except by heat which would be otherwise wasted. Is it possible by having separately-fired feed heaters in series with economizers, to put the water into the boilers at the same temperature as the steam and so obtain more duty per boiler, and reduce the number under steam, thus effecting a saving in coal? The true function of a boiler would then be steam raising, and not feed heating in addition. Under existing methods the limit to which heating can at present be carried is to have an exhaust heater in the path of the steam, on its way from the cylinder to the condenser, and in series with it a heater which will utilize the exhaust steam from the auxiliary engines, the water afterwards passing through a third heater in the form of an economizer. The temperature to which the feed water can be raised has a decided bearing on the subject, as the economy resulting from raising feed water from 150 degrees Fahr. to 500 degrees Fahr. is 10 percent.

When the boilers and piping have been covered by the most suitable material, it is necessary to have it periodically examined and repaired, as it is usually of a perishable nature. Where it is inclosed in a metallic envelope much waste may be caused if there is contact between the piping and the shield, which may be at nearly the temperature of the steam. Condensation may be reduced one-half if the valve bodies and flanges are covered. The joint itself may be left exposed, but with superheated steam there is little trouble from leaky joints, if the ranges are well drained.

Conclusions.

Perfect combustion of fuel cannot be obtained in any form of boiler, but it ought to be possible to considerably raise the low thermal efficiencies at which most of them are working at the present time. The two essentials are: The highest possible initial temperature in the combustion process, as the heat transmission between the water and the hot gases is directly proportional to their difference of temperature; and a high temperature in the combustion chamber, so that the volatile gases are not cooled down before combustion takes place.

The author has carried out a large number of evaporation tests at different rates of combustion, and with different forms of combustion chambers, on hand-fired 7 x 28-foot Lancashire boilers. The evaporation per pound of coal from and at 212 degrees Fahr. varied from 6.62 pounds to 7.17 pounds. Coal burnt per square foot, from 33 pounds to 17 pounds. Evaporation, from 5,250 pounds of water per hour to 3,900 pounds, and the superheat from 151 degrees Fahr. to 80 degrees Fahr. One boiler is fitted with steam blowers. On test 5,400 pounds of water per hour was evaporated. After deducting the steam taken by the blowers, the evaporation per pound of coal was only 6.21 pounds.

On a special test it was found that the steam jets, when giving a draught equal to ⅝ inch in the ashpits, required 340 pounds of steam per hour, equal to 6 percent of the steam generated. The fine ash made by the ordinary furnaces amounting to 3 percent of the coal burned, approximately 200 tons per annum, is dealt with by this boiler; it was found to have an evaporation value equal to one-half that of the slack. Under the conditions stated in Southport they obtained an average evaporation of 7 pounds of water per pound of coal, having a calorific value of 13,800 B. Th. U. Their average combined boiler superheater efficiency, therefore, is only 52 percent.

The controlling interest of the Commonwealth Steel Co., St. Louis, has been acquired by Clarence H. Howard and others and was purchased from the Niedringhaus firm, which retains a minority interest. The company is capitalized at $1,000,000, and the plant is located at Granite City, Ill. The Commonwealth is a cast steel plant with a monthly capacity of 3,000 tons of open-hearth cast steel. Under the new management the plant will be devoted principally to the making of railroad cast steel specialties. At a meeting of the new company Mr. Howard was elected president. In the past twenty years he has been assistant master mechanic of the Missouri Pacific railway; superintendent of the Missouri Car & Foundry Co. plants at Cambridge City, Ind., and Kansas City, Mo.; manager of the Scarritt Car Seat Works; vice president of the American Steel Foundries and has held other positions with manufacturing concerns.

A cablegram from St. Petersburg states that Lewis Nixon, of New York, has closed a large contract with the Department of Mercantile Marine of the Russian Government for building ships for the Black sea. They will be constructed in the yards at Sebastopol. The work of construction will begin next winter. Mr. Nixon will personally supervise the building of the ships and for that purpose will spend the winter there.

The Baldwin Locomotive Works, Philadelphia, are completing the last of the fourth order of locomotives for the Japanese Government. The Southern railway has ordered twenty-five locomotives from the Baldwin Works, and the Central railroad of Georgia has given the company an order for twenty locomotives. All are to be of the heavier class. Within the past few days the company shipped the last of an order of sixty-five locomotives to the Wabash, nearly all for use on the Pittsburg division, recently opened for traffic.

The Birmingham Boiler Works, Birmingham, Ala., have passed from the hands of a receiver, and W. M. Crellin, proprietor, is in full charge. The secured creditors have been paid in full and an arrangement has been made with the unsecured creditors.

W. W. Ackley and T. W. Mills have been appointed receivers of the Caldwell Car & Mfg. Co., of Caldwell, O.

HIGH TEMPERATURE MEASUREMENTS—III.

BY S. H. STUPAKOFF.

Methods and Measuring Instruments.

No establishment producing merchandise from raw materials can accomplish its end without the application of heat. To produce heat, all must use some kind of fuel; and whether it be in large or small quantities, to use it economically the engineers in charge should either study the subject in all its details or seek the advice of experts, who can point out the proper lines of eceonomy.

Success in the metallurgical operations depends upon the judicious application of heat at temperatures within well-defined limits to suit each particular purpose. All processes in which heat is required are most satisfactorily carried out when the regulation of the temperature is absolutely under control of the operator. This is only possible with the aid of instruments which will record the correct state of calorific conditions. It is true, much depends upon the selection, the quality, the heat value and the application of the fuel, and much upon the design of the furnaces, upon the draft and upon the proper admixture of air to cause perfect combustion. But none of these points concerns directly our present discussion.

Where shall we begin? By giving an account of the temperature of the sun, our exemplification of the principal source of heat and power? As mentioned elsewhere, it has been vainly attempted for a hundred years, and we have figures ranging all the way from 1,500 to some odd 1,500,000 degrees centigrade, or from 2,730 degrees to 2,900,000 degrees Fahr. The first value was given us by Violle, the other by the celebrated Father Secchi. Should neither one of these values be acceptable, the reader has his choice between Pouillet's 3,200 degrees Fahr., Violle's 2,730 to 4,530 degrees, Wier's 4,850 degrees to 5,450 degrees, Pouillets (corrected by Langley's constant) 5,000 to 6,000 degrees, Rosetti's from 9,000 degrees to 18,000 degrees, Zoellner's from 26,000 degrees to 34,000 degrees, Soret's 145,000 degrees, Ericsson's 1,303,640 degrees, and Le Chatelier's 13,700 degrees Fahr., which latter value was confirmed by recent researches of Wilson and Gray.

This seems to be dangerous ground to walk on; besides, it is too far removed from our ordinary pursuits of life to be of immediate use and value to our manufacturers and engineers. We had better commence at the bottom and work upward. Nevertheless, these data will serve to furnish us with excellent proof of the existence of unexplored fields, which need investigation and the attention of the exact sciences in co-operation with the work of our engineers.

A number of different instruments are in use for measuring low and high and small or large ranges of temperatures. We may divide them into two large groups—thermometers and pyrometers. Everybody knows the form and construction of our common commercial thermometer, but perhaps there are not many who know the large variety of forms under which they are to be had. They run from the clinical thermometer, with a total range of but a few degrees and division, into tenths of a degree Fahrenheit, to the nitrogen thermometer, made of a special hard boro-silicate glass, which is suitable for measuring temperatures beyond 500 degrees C.

A number of ingenious instruments have been devised for the determination of the degree of temperature or for the quantity of heat emitted by a warm body by radiation. They were principally made for laboratory use and have given in their place good service. Of these it may be sufficient to name Leslie's differential thermometer, Rumford's thermoscope, and Melloni's thermopile. Many of our readers will remember this last interesting little instrument, which is so sensitive that the heat radiated from the human body, or even of a hand held from it at several feet distance, will deflect the needle of a sufficiently delicate galvanometer which has been connected to its terminals. Properly speaking, these instruments should be classed as thermoscopes or pyroscopes.

Pyrometers may be divided into radiation pyrometers, contraction pyrometers, fusible cones, calorimetric pyrometers, gas pyrometers, optical pyrometers, resistance pyrometers, and thermo-electric pyrometers. These comprise about all instruments which have been put into practical use in industrial establishments. Some of them have been long since abandoned; others are still used on rare occasions, whereas a few have gained a good reputation, a strong foothold and wide application in actual practice.

The indications of radiation pyrometers are subject to the variable emissive power of different substances, and they depend further on the temperature, the surface and the distance from the heated body, as also on their own absorbing power. They are principally used to determine very high temperatures, which no substance can be exposed to without destruction or change of state. The heat absorbed by the radiation pyrometers is used either to indicate directly the rise of temperature or its equivalent in electrical resistance or the strength of a thermo-electrical current. The quantity of radiated heat is proportional to the radiating surface and varies as the square of the distance from the heated body.

Among the principal instruments belonging to this class are Gasparin's hollow brass sphere, Pouillet's pyrheliometer, Violle's actinometer, Rosetti's thermo-electric pile, Wilson and Gray's thermo-electric balance, Herschel's actinometer, Jolly's meldometer, and Langley's balometer.

The last named was made in the establishment of Prof. John A. Brashear in Allegheny, Pa., and under his supervision. It was especially designed, constructed and used to study the distribution of radiant energy in the solar spectrum, and Mr. Brashear assured the writer that its sensitiveness is so acute that it will indicate the variation of the millionth part of a degree. The other radiation pyrometers were principally employed to determine the heat radiation of the sun, the results of which were made use of to determine the sun's temperature, of which a few interesting examples have been cited above.

Contraction pyrometers are solely represented by Wedgewood's, in which the permanent contraction of clayey substances under exposure to heat is utilized as an indicator to determine the corresponding temperature. In rare instances they are still used in a few potteries. These instruments cannot be recommended as true pyrometers, as the irregular contraction between any two or three points does not guarantee even an approximate precision. But they are inexpensive and convenient for the mere indication of equality, or inequality of two temperatures. They are not pyrometers but pyroscopes. The scale employed by Wedgewood compares with our centigrade scale about as follows:

Wedgewood	0	15	30	100	140
Centigrade	600	800	1000	1200	1400

Wedgewood himself attributed a temperature of 10,000 degrees C. to his 130th division, which certainly did not exceed 1,500 degrees C., and among other things he claimed that the melting point of cast iron was at 20,577 degrees C., whereas we know that it does not exceed 1,250 degrees C. Nevertheless, he deserves the undisputed credit of being the first to attempt the exact determination of high temperatures, and an investigator who fully realized the importance and the value of being able at least to duplicate certain degrees of temperatures to obtain desired results.

Fusible cones originated about a hundred years after the invention of Wedgewood's pyrometers, and they have just entered their age of maturity. They consist of a definite mixture of vitreous matter for which the point of fusibility, or rather the collapsing point, has been determined by comparison with the direct readings of a La Chatelier pyrometer. They were made originally in Sevres, France, by Lauth and Vogt to determine a limited number of specific temperatures which were required in the particular modes of manufacture in use at that place. A few years later they attained their present perfection in the hands of Seger, of the royal pottery works at Berlin. He established a series of cones in 60 different grades with fusing points from 590 to 1,890 degrees C. They consist substantially of quartz, feldspar, carbonate of lime and kaolin, with an addition of calcined alumina, oxide of iron, oxide of lead, carbonate of soda or boric acid.

It is not claimed for the Seger cones that their estimated temperatures are absolutely correct, and that the individual cones of each group do absolutely correspond with each other. Neither is this essential for the purpose to which they are principally applied. They are certainly useful guides in all cases where it is merly required to bring the heat up to an approximate limit and then let it die down. On this account they have been quite favorably received by the ceramic industries, where they find extensive application. A series of the cones is placed in a furnace opposite a glass screened peep-hole, through which their behavior may be watched from the outside. Under the action of heat they gradually soften and thereby contract at the beginning without change of form, then they bend over and finally flatten out completely. Naturally, they are only good for a single application.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

The certainty and the uncertainty of things depend much on the manner of looking at them. A man may and frequently does see facts from such an angle that the perspective is faulty and his sight goes wrong. Here is an individual seeing what other people cannot possibly see and solemnly affirming the existence of circumstances and conditions hidden from the rest. One of these investigators who sees things has been giving the other fellows the benefit of his inquiries and asserts that corn ground by steam will heat and corn ground by water power will not heat. It is not clear just how the difference in the power generation would make the change in question and one can only fall back to a general doubt of the claims set forth. The amount of energy developed in the falling of a bucket of water would be the same no matter by what numerous ways the bucket was filled and raised.

* * * * *

Some practical mill men have pointed out that there are other factors in the problem. The causes may be so nearly connected with the power supply that it is really not so surprising after all that misunderstanding arises. One of these says it is solely a matter of speed. The machinery of a steam-driven mill runs so fast that more heat is generated in the grain and on the other hand a water-driven mill works at less speed and the amount of heat generated is lessened. Now, of course, a water-driven plant can operate at a high speed but the point is made that this is not the custom and here again is the need of circumspection when testing theory by practice.

* * * * *

Meal ground on a dull, slowly cutting stone will undoubtedly heat quicker than meal ground on a sharp stone. There does not seem any uncertainty about this circumstance and then there is the manner in which the grain is stored. Damp grain will heat if left in large bulk and this, too, whether it is ground by water or steam power. The converse of this proposition would appear to be easily conceivable and that meal from dry grain is safe from the danger of heating—no matter what the motive power of the grist mill.

* * * * *

Another instance narrated by the correspondent of the *Scientific American* refers to the influence of belts upon the nervous system. Most mechanics are familiar with the phenomena of static electricity about shop belting and particularly in engine rooms. The following extracts from the comments by other correspondents will be worth reading: "The kind of electricity spoken of is static or frictional and is the same as lightning. It is generated by the friction of two unlike non-conducting substances. Its cause in this case is the friction of the belts and pulleys, and it exists as a charge on the surface of the belt. By consulting a standard work on electro-therapeutics, we find that static electricity is used much in treating nervous affections and that it requires care and skill to apply it so that the effects will not be injurious. There is no doubt that this treatment is beneficial to the nervous system when it is applied correctly, with reference to quality and quantity. The charge from a belt is irregular and varies constantly and we find that electricity applied in this manner injures the nervous forces. A person when subjected to the influence of a current or series of discharges for any length of time becomes numb and his breathing and pulse slow down considerably, even if the current is so mild as to cause no annoyance. Once I had an opportunity to remedy a case of this kind in an electrical plant. The main shaft was driven by two wide belts and anyone passing near them invariably received a severe shock, which was a constant inconvenience. This discharge may be effectively prevented by running wires from any water or gas pipes in the building and fastening the ends near the belt, or they may be allowed to touch the belt. This allows a path for the discharge and proves an effective remedy."

* * * * *

Another contribution to the stock of knowledge on the shop phases of static electricity is as follows: "While engaged in the manufacture of certain staple articles, about eight years ago, I had occasion to do considerable lathe work. The lathe upon which I worked had a twisted belt which was always strangely charged with static electricity, so much so in fact, that tufts of dust would cling to the leather. The belt would readily suck the oil from a spoon and wire-draw it into hair-like strings which would encircle the belt. Before this experience I had been a sufferer to a marked degree from nervousness or excessive nerve tension, but soon after I began my lathe work I felt a change for the better, though, I must admit, accompanied by a slight falling off in muscular vim. During the past year I found that after using a large Holtz static generator, with which to carry on experiments, considerable ozone was liberated. The gas would fill the room in a short time, so that my health became powerfully affected, causing pains in the thorax, and general distress, which fresh air seemed to relieve. If there are frequent discharges from the belts it is quite probable that a man working near them would in time become affected. More ventilation would be needed in the room, or else the machine itself should be grounded. While the presence of an excess of ozone in the air, owing to its superiority to oxygen, may cause undue nervous tension and a subsequent reaction, I believe that a nervous system of ordinary tone would in time become affected and finally succumb, because of a continued form of electro-catalytic action on the highly sensitive animal tissue."

J. Frank Aldrich, trustee in bankruptcy for the New York Car Wheel Works, Buffalo, N. Y., has sent out a circular to the creditors of the St. Thomas Car Wheel Works at St. Thomas, Ont., announcing the sale of the plant of that company for $38,000. The purchaser was the Canadian Iron & Foundry Co., of Montreal. The Canadian plant was owned by P. H. Griffin, of Buffalo, who was also head of the New Work Car Wheel Works. Another Griffin plant, the Montreal Car Wheel Co., which has not been operated for two years, will also go under the hammer.

A meeting of the directors of the Youngstown Iron Sheet & Tube Co. will be held Sept. 30, at which time the company will decide when it will erect the new 12-inch mill. S. V. Huber is preparing plans, which will be submitted to the directors.

The Tyler Tube & Pipe Co., Washington, Pa., is adding four lap weld furnaces, which will give this plant practically double its present capacity. The new building that is being erected to accommodate these furnaces is 140 feet long and 105 feet wide.

Notices to resume this week in mills Nos. 8 and 9 have been posted at the W. De Wees Wood plant of the American Sheet Steel & Tin Plate Co., at McKeesport, Pa.

Sixteen ships were loaded with iron ore at the docks of the Duluth & Iron Range road at Two Harbors, Mich., in 24 hours last week. It was the greatest achievement of the kind on record, for the boats were given a total of 87,835 gross tons.

The Aetna-Standard plant of the American Sheet & Tin Plate Co., Martins Ferry, O., is on in full this week. The Laughlin tin mill at that place continues idle in the hot departments, but the terne and tinning departments continue working on plates shipped in from other points.

The Jones & Laughlin Steel Co., Pittsburg, has placed an order with the American Car & Foundry Co. for an additional 100 steel coke cars.

No. 3 furnace of the Isabella plant of the Carnegie Steel Co., Etna, near Pittsburg, resumed operations this week.

The Bessemer department and two idle stacks of the Shoenberger plant of the American Steel & Wire Co., Pittsburg, have resumed operations after an idleness of about one month.

The Portsmouth Steel Co. has moved its office from Wheeling, W. Va., to the Laughlin building, Martins Ferry, O.

THE IRON TRADE REVIEW

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AUGUST 25, 1904

ANNOUNCEMENT.

Mr. G. H. Gardner has resigned as president of the Iron & Steel Press Co. and Mr. John A. Penton has been elected to succeed him. Mr. Gardner has been connected with *The Iron Trade Review* for the past 13 years and has had the direction of its business policy in the period of its rapid advance to popularity and influence in the iron and machinery trades. His associates greatly regret his withdrawal from the company and wish that whatever the field he enters he may have the reward his industry, probity and talent well deserve. His untiring efforts have had much to do with the success of *The Iron Trade Review* and its associated publications.

Mr. Penton needs no introduction to the machinery and metal trades. Best known through his long and intimate connection with the foundry industry, he has been an indefatigable worker upon problems that are of utmost moment to manufacturers, particularly in their relation to their employes.

THE SITUATION AS TO PRICES.

Wall Street and the Eastern press were engaged a few weeks ago in celebrating in advance the return of prosperity to the iron trade. In the past week they have accomplished on paper the dissolution of all pools and price agreements and restored an open market on finished steel products. While at the moment there is more foundation in trade conditions for this latter prophecy than for those of the contrary sort that were popular in speculative circles in July, it is taking much for granted to assume that the recent conversion deal at Pittsburg and the cut in wire products mean the coming of swift demoralization into every department of the market. The situation accents, however, what has been said in these columns from time to time since the opening of the year concerning the price policy of those who have sought to regulate the steel market.

The United States Steel Corporation, both by its quotations and by frequent public statements of its officers, emphasized in the first two years of its existence its intention to prevent in large measure the extreme fluctuations that in the past have given the alternation of the prince and pauper condition in iron and steel. While railroads were taking up old track and selling it in the scrap market for several dollars more than enough to replace it, the price of new rails was maintained steadily at $28. There was agitation of advances in plates and shapes at intervals in 1901 and 1902, and even early in 1903, but the Steel Corporation contended for the maintenance of the old price, even though individual mills were able to get advances of several dollars a ton from that basis. The present price of $28 for steel rails dates from April, 1901, when an advance was made from $26. The 1.60c price for plates was established in April, 1901, and the 1.60c basis for beams and channels in March, 1901.

The events of the past twelve months have demonstrated that consumers do not regard the maintenance of an even keel in the above named products while demand was greater than supply, as being of any weight whatever as an argument for the continuation of such prices under the conditions of recent months. The predictions that the Steel Corporation would be influential in maintaining levels that would fairly average the crests and troughs of the waves of former years have not been fully borne out, though there is no doubting that the steadying hand of a powerful producer has saved the trade from serious demoralization in more than one line since the sudden slump in October last year.

At the moment the situation is disturbed not a little. How sensitive it had become under the strain of months of poor demand appears from the fact that the making of one contract involving the turning of pig iron into half finished steel has put the entire steel trade on edge. Old rails may sell for more than new ones, and the iron trade goes on its prosperous way. But when light rails bring $10 less than heavy rails, and fabricated material is sold at considerably less than the pool price on shapes plus labor and the profit of manufacturing for erection, then the foundations of the market are threatened. It is today a matter of common knowledge that the various cuts from pool prices in the past six months have now brought steel manufacturers face to face with a problem on which they are thinking hard. Agreements have not been kept, apart from that on rails. The form of reaffirmation of prices that are only nominal will not be gone through with again. On one hand is an open market for a time, trusting to developments later in the year or early in the new year to bring prices to a profitable level under the stimulus of pent-up demand. The alternative is a recasting of agreements on a lower level of prices and the inclusion of certain producers who now act independently. Powerful influences are at work to secure the latter outcome. While the history of the trade suggests that heroic measures have been the quickest road to healthful conditions, there are features of the present situation that call for strenuous efforts to prevent demoralization. The quiet quarter of the year is near at hand, and more than six months must pass before the spring work of 1905 will be a factor. Yet demand is by no means at a standstill, except as it has been halted by the existing uncertainty, and hand-to-

mouth buying for the remainder of the year promises to give the mills fair employment. There is much to lose in profits under a demoralized market and little to gain in business in the immediate future. At the same time the causes of friction in the pools are very tangible, and while this may be a new era, history is still counting and the very human element that always exists in trade wars has not been eradicated.

THE BRITISH RAILROAD HANDICAP.

High freight rates and the seeming unwillingness of British railroads to make any concessions that would help iron and steel manufacturers of the United Kingdom to hold their own against American and British dumping, are one feature of the present situation that has attention in the report of the Chamberlain tariff commission. A recent practical example of the handicap the attitude of the railroads has put upon British iron and steel manufacturers is furnished in a Midlands, Eng., market report which refers to the keenness of the competition of foreign wire rods. A large tonnage of rods is imported by English wire works from the Continent. The rate on rods from Antwerp or Rotterdam delivered at London is 13s 6d, whereas from Midlands works to London the freight is 15s.

A more flagrant illustration of the inequity of the British manufacturers' position in the matter of railroad freights comes from the United States. A Central Western concern that has exported washed metal at intervals in recent years has been able at times to get a through rate of $3.75 to Liverpool. Against this low rate on a land and water haul of 3,600 miles is the charge of $2.50 for a 100-mile haul over a British road. The Chamberlain tariff wall must needs be high if it is to compensate the British iron manufacturer for the exactions of his home railroads.

Reduced Freights on Steel Exports.

(Special Telegram.)

PITTSBURG, Aug. 24.—The reduction of 33⅓ percent in freight rates on iron and steel exports, granted at a meeting of the trunk line and central freight committees in November last and effective on Dec. 1, and to expire on Aug. 31, has been extended to the first of the year by the railroads. This action is of the utmost importance, as it was believed that owing to the refusal of the steel rail manufacturers to reduce the price of rails the rate would not be extended. The rate on billets, slabs, sheet and tin bars from Pittsburg to Boston and New York is $1.75; to Philadelphia, $1.55; and to Baltimore, $1.45. On pig iron they are $1.60, $1.40 and $1.30, respectively. The reduced rates apply to everything covered by the special iron and steel tariff. At the time these special rates were applied for the steel manufacturers asked for a reduction of 50 percent, but the railroads refused to grant this.

Colorado Fuel & Iron Co. Reorganization.

Announcement was made Aug. 22 that the new financial reorganization plan of the Colorado Fuel & Iron Co. has been declared operative. The holders of $1,710,000 of the $14,068,000 debenture outstanding bonds of the company have refused to join in the reorganization plan of the bondholders' protective committee. The non-assenting holders, it is believed, will be provided for and their bonds kept alive. The committee, of which James A. Blair is chairman, will now arrange for the issuance of $45,000,000 of bonds and $6,200,000 new stock to carry out the plan. About $13,000,000 cash will be provided to purchase properties sold, pay for enlargements and improvements, complete additions in progress and enable the company to operate with reasonable economy. The new bonds are issuable or reserved as follows: Issuable in exchange dollar for dollar for present debentures (which also receive 20 percent, $2,800,000 in common stock), $14,000,000; to provide approximately $13,600,000 for repurchase of properties sold and additional working capital, $17,000,000; reserved to retire dollar for dollar the existing first mortgage bonds, $6,000,000; reserved for additional capital and future requirements, $8,000,000. The bonds issued in exchange for debentures will be likewise convertible into stock at par. A syndicate has agreed to underwrite the $13,600,000 cash payment, receiving $1,000 in bonds and $200 in stock for each $800 paid, the stockholders and then the debenture holders to be given the right to subscribe on this basis.

Heavy Rail Orders.

(Special Telegram.)

NEW YORK, Aug. 24.—On the authority of a member of the rail pool it can be stated that orders placed during the past week aggregate 125,000 tons, of which 65,000 tons came from domestic roads, chiefly in the Southwest. An order for 60,000 tons was given by the Temiscamingue railroad, the branch road the Canadian Pacific is building from Toronto west to the Pacific Ocean.

Independent Sheet Association Dissolved.

(Special Telegram.)

PITTSBURG, Aug. 24.—The dissolution of the independent sheet manufacturers' association is reported from Youngstown, O., where James A. Campbell, president, and James H. Nutt, commissioner, are located and where the headquarters of the association were established. Announcement has been made that efforts to agree on prices with the American Sheet & Tin Plate Co. proved futile and furthermore there was some difficulty experienced by the members in agreeing among themselves.

Important Steel Conference in New York.

(Special Telegram.)

NEW YORK, Aug. 24.—An important conference was held here yesterday in which matters relating to steel pool agreements were discussed. Among those participating were President Corey, of the United States Steel Corporation, Acting President Moses Taylor, of the Lackawanna Steel Co., and Vice President Willis L. King, of the Jones & Laughlin Steel Co. While none of the conferees would discuss the meeting it can be stated on authority that it developed a unanimous opinion that the continued existence of all the pools in finished materials was for the best interests of the iron and steel trade. To this end it was said that the Lackawanna Steel Co. will either join the structural pool and later the plate pool, or make the prices of the latter the basis of its sales. Prices of finished materials were thoroughly considered, but no definite agreement was arrived at. The conference is reported to be preliminary to several more to be held later, on conditions in the structural shape, plate and bar associations. Published reports that the billet pool will hold a meeting in this city today cannot be verified.

Work on the erection of stack No. 3 at the South Sharon plant of the Carnegie Steel Co., South Sharon, Pa., has been practically completed, and the furnace is in shape to blow in at any time. At this plant there are now two new furnaces that have never been operated. Stack No. 1 is still undergoing extensive repairs.

The Pennsylvania Railroad on Aug. 22 made the most sweeping reduction in the time of the men employed at Altoona, Pa., that has taken place since the panic of 1893. The employes of the machine shop were notified that commencing Aug. 24 they would be divided into shifts, each shift to work every other day, eight hours to constitute a day's work. One shift will work Mondays and Wednesdays and the other Tuesdays and Thursdays. The remainder of the week the shops will be closed down entirely. It is not known how long the order will continue in effect.

The Painter plant of the Carnegie Steel Co., West Carson street, Pittsburg, resumed operations in full this week.

The Labor Situation.

STRIKE ON IN STEEL CORPORATION HOOP MILLS.

The Amalgamated Association of Iron, Steel and Tin Workers declared a strike this week against the American Steel Hoop mills of the Carnegie Steel Co. in the Youngstown, O., district. Last June the officials of this company notified the association that it desired a rearrangement of the scale for its mills, owing to the large amount of improved machinery installed, enabling the men to make larger tonnages per turn than heretofore, thus greatly increasing their wages. The company had numerous conferences with its employes, but no definite conclusion was ever reached. A number of the skilled men employed in these mills work on a salary basis, being also members of the association; and at the request of their employers they returned to work in the Upper works last week. The association notified these men that their contracts with the company should not be violated, but that they should not renew them when they expire unless a settlement is reached with the men who work under the scale. According to the officials of the Amalgamated Association, the reductions demanded range from 28 to 71 percent. An attempt was made to start the Girard, O., mill of the company this week, but none of the former employes returned to work.

The National Tube Co. also has a strike on its hands at its Republic works on the South Side, Pittsburg. No scale has been signed for this mill, and indications are that none will be signed. The Amalgamated Association now only controls this one mill of the National Tube Co., and this will probably be non-unionized before the end of the year. That the association will lose the Youngstown district mills of the American Steel Hoop Co. is almost a certainty, and with the loss of these mills and the Republic of the National Tube Co., the Amalgamated Association will only be a power in the tin plate industry of the United States Steel Corporation. Its hold has been broken in the sheet trade, where it controls less than half the mills of the American Sheet & Tin Plate Co., and it is now predicted that the entire elimination of the Amalgamated Association as a factor in the wage affairs of the subsidiary companies of the United States Steel Corporation is not far distant.

At Youngstown, O., on Sunday, Aug. 21, the men employed in the American Steel Hoop Co. mills in that district held a mass meeting and decided to call a strike. The following statement, outlining their position, was issued: "The conference committee of the Amalgamated Association of Iron and Steel Workers, after striving to negotiate for an amicable settlement with the Carnegie Steel Co., a constituent company of the United States Steel Corporation, has been forced to declare a strike against the said company because they have delivered an ultimatum which called for a price the adoption of which would entail a reduction from 28 percent to 71 percent and refused to continue negotiations unless said reduction was accepted. To accept this meant the annihilation of the iron industry in the Mahoning Valley, a proposition which no sane man or organization would accept. At a meeting held with all the employes of the Carnegie Steel Co. the action of the conference committee and executive board was unanimously endorsed and effective arrangements have already been made by the conference committee to support the strike financially."

THE NEW YORK BUILDING TRADES STRIKE.

The Building Trades Employers' Association, of New York, has decided not to declare for the open shop. Instead it will deal with the unions individually or with individual members of those bodies, and take them back to work upon their signing the arbitration agreement. Philip Weinseimer, president of the Building Trades Alliance, has been indicted by the Grand Jury on the charge of extortion in accepting from Geo. J. Essig, a plumber, $1,000 and several notes obtained by means of threats to injure, annoy and obstruct Essig's business. In retaliation for this arrest, the Alliance threatens to sue the employers for conspiracy and ten more unions have been ordered to strike. There is, however, a revolt against Weinseimer's methods, and at a meeting of unions, held Tuesday evening, there were scenes of wild disorder and the plumbers decided to return to work. One man who denounced Weinseimer was thrown from the room, but he returned and successfully led the revolt.

BAR IRON CONFERENCE.

At Chicago on Tuesday the bar iron conference committee of the Amalgamated Association of Iron and Steel Workers met with the officials of the Republic Iron & Steel Co. for the purpose of discussing the iron scale for the ensuing year. The arbitration board has not yet been called upon to act, although two of its members have been appointed. It is believed that if no agreement is reached the Republic Iron & Steel Co. will not ask for further conferences, but will operate its mills open.

N. M. T. A. EMPLOYE'S CERTIFICATES.

The National Founders' Association and the National Metal Trades Association have for some time made use of certificates issued to workmen who have rendered efficient service to members. In the past week the National Metal Trades Association has sent to its members forms of recommendation for such of their employes as are entitled to such certificates. Accompanying these forms is a leaflet, from which we take the following:

The certificate is in the form of a handsome booklet, bound in deep red morocco leather with a flexible cover, lettered in gold. The inside pages are printed on bankers' safety paper, which shows every erasure, thus preventing forgery. The first page is an identification page, giving description of the holder. The second page is an acceptance of the certificate, subject to the conditions printed therein, signed by the holder of the certificate and his signature witnessed by the firm for whom he is working at the time of its receipt.

All employers having certificates presented to them are expected to compare the signature in the book with the signature of the man presenting the certificate for further identification.

The inside page is the certificate itself and, in form, certifies that the holder has rendered faithful service to this association and its members in certain shops at certain times and that he is heartily commended to the kindly consideration of every member of the association. The certificate is signed by the president and secretary and by the firm upon whose recommendation it is issued. The rear page has space for endorsements of other firms who can and may have occasion to further recommend the applicant after the issue of the certificate.

The objects of issuing the certificate are twofold. First, to give faithful employes of members of this association a recognition they cannot get in any other way. Second, to permanently take care of men who have worked for members of this association during labor troubles. The association is very careful as to the kind of men to whom it gives these certificates. First and foremost, they must be good workmen, in their class, which is stated in the book. Second, they must be of good character, steady and reliable. Third, they must have worked for not less than sixty days during strike conditions in shops of the members of the National Metal Trades Association.

It is a well-known fact that one of the great threats used by the strike pickets towards non-union men is the threat of the union's blacklist; to hound men from Maine to California, and to keep them from getting a job. All members of the National Metal Trades Association, through their pledge of fair dealing, are bound to give preference in employment to the holders of these certificates, thereby assuring them of the National Association's support after the strike is over.

Besides the support of the National members, the certificate holders can always be assured of the personal efforts of the secretary and commissioner of the association in taking care of them.

The association has issued hundreds of these certificates to faithful employes, who either remained at work when others struck or took work under the same conditions. Even in the present dull times, there is not one of those certificate men out of employment.

In addition to all of the above, the secretaries of local metal trades employment bureaus are only too willing to particularly interest themselves in the certificate-holders' behalf in securing employment. Should a certificate-holder be located in a town where there is no metal trades employment bureau, a letter to the National office in the Union Trust building, Cincinnati, O., will soon be the means of placing the certificate man in a position.

Every employers' association and citizens' alliance in the country knows about this certificate, and like favors can be asked of the secretaries of such bodies without any hesitation on the part of a certificate-holder.

Finally, many individual employers, knowing the great care exercised in giving the certificates and knowing that the association considers this little book a standing recommendation, not only to its own members, but to employers generally, are

very glad to give preference to National Metal Trades Association certificate men.

The form of application blank which the association is sending to its members is shown in the following:

APPLICATION
FOR CERTIFICATE OF RECOMMENDATION
Issued by the
NATIONAL METAL TRADES ASSOCIATION

.. *City*.....*State*.....*19*....

To THE SECRETARY:

Dear Sir: I hereby make application for Certificate of Recommendation under the rules and regulations on the back hereof, and for your information will make the following statement:

Name in full .....
Age ..... *Married*.....
Street Address .....
City .....(... *State* .....
Birthplace ..... *Nationality*.....
Height .....*Ft*.....*In.* .....
Complexion.....*Color of Hair*.....*Color of Eyes*.....
Particular Marks .....
Specialty .....
Served Apprenticeship with.....
(Name of Firm.)
In the City of.....*State*.....
From (Date).....*To (Date)*.....
Remarks .....

HAVE WORKED IN FOLLOWING SHOPS:
(Name of Firm.)
.....*City* .....*State* .....
From (Date) .....*To (Date)*.....
And also for.....*City*.....*State*.....
(Name of Firm.)
From (Date).....*To (Date)*.....
Signed .....
(Signature of Applicant is required.)
Mail card care of.....

We recommend that Certificate of Recommendation be issued on this application and certify that the applicant Has Rendered Faithful Service during the time stated, is of Fair Character, and a Good Workman in His Line.

.....
(Firm name of member of the National Metal Trades Association.)
By.....
Date .....*190*....

P. S.—Read carefully before signing.

The rules governing the issuance of certificates are as follows:

RULES AND REGULATIONS.

The National Metal Trades Association issues certificates of recommendation subject to the following rules and regulations:

1. The certificate is issued for faithful and efficient service rendered to the association. Its acceptance by the holder is with the understanding that he will remain loyal to the association and its members.

2. The certificate is the property of the association and may be revoked and recalled at any time at its pleasure. It is not, however, the intention of the association to revoke the certificate except upon evidence of disloyalty on the part of the holder toward the association or its members.

3. Upon taking employment with a member of this association, the holder of a certificate shall deposit it with his employer, who shall keep it in a safe place, and upon the termination of such employment shall return it to the holder, after having endorsed his firm name on opposite page with the date of certificate holder's employment.

Provided, however, that if, in the opinion of the employer, the holder of the certificate has been guilty during the term of such employment of any act of disloyalty toward the association or any of its members, it shall be the duty of such employer to forward the certificate to the commissioner of the association, together with a full statement of the case. The commissioner shall then investigate the matter, in pursuance of such rules as may be made by the administrative council, and shall revoke the certificate or return it to the holder accordingly.

NATIONAL METAL TRADES ASSOCIATION.

The National Metal Trades Association is posting in the shops of its members in Chicago notices announcing to the men at work that their positions are permanent so long as their conduct, competency and conditions of business warrant. The notice further reads: "No settlement with the machinists' union is contemplated. The management pledges itself that under no circumstances would any settlement be allowed to affect in the slightest degree its relations with the men in its employ or the peaceful pursuit by them of their employment." This notice has done much to reassure the men who have gone to Chicago to take the strikers' places.

The commissioner and secretary are making arrangements to close the temporary Chicago office and resume their quarters at the home office in Cincinnati. This will probably be accomplished on or about Sept. 1. Arrangements have been made to take care of the men that may be brought to Chicago after the removal by the association's employment agency or through the secretaries of the various local associations operating labor bureaus.

Commissioner Eagan has been in New York in consultation with H. M. Covell, president of the association. Wednesday afternoon and evening last he was the guest of the Metal Trades Association of Boston, Mass., at a dinner.

A special meeting of the New York Metal Trades Association was held on Aug. 16, and was well attended. The outside men of the Logan Iron Works employed on tank work at $3 per day struck for $3.20. The following day they applied at the office of the company and asked for their places at $3 per day, but were informed that their services were not required. The outside boilermakers of the Franklin Machine & Boiler Works, employed in a building at $3.20 per day, struck to enforce the demand of the holders and heater boys for the same wages. Their places were immediately filled. The boilermakers of C. Cunningham, on work on a tank at the foot of 138th street, were called out by their business agent to enforce a demand for $3.20 per day.

The strike of the boilermakers of the New York, New Haven & Hartford system has been settled and about 300 men have returned to work. The men get an increase of 2 cents an hour and a nine-hour day.

FUTILE FOUNDRY CONFERENCE AT CINCINNATI.

(Special Telegram.)

CINCINNATI, Aug. 24.—A meeting has just been held at the Grand Hotel, this city, attended by representatives of the National Founders' Association and the Iron Molders' Union, to consider local differences between founders and molders. The National Founders' Association was represented by W. D. Sayle, of Cleveland; F. W. Hutchings, of Detroit; W. H. McFadden, of Pittsburg; and John F. Leary, of Cincinnati. The molders were represented by President Valentine and by Henry Hinnenkamp, of Cincinnati, and Valentine Barrie, of Pittsburg. The question of interpretation of the New York agreement came up. The molders claimed that the Cincinnati foundrymen posted notices of a reduction of 20 cents a day 15 days before it was to go into effect, while, they contended, the New York agreement calls for 30 days' notice. They claimed that the agreement was violated by the action in Cincinnati and refused to discuss the matter of wages until the question of the alleged violation of the agreement was disposed of. No adjustment of the matter was reached and the conference adjourned. The New York agreement, so far as the foundries in Covington, Newport and Cincinnati are concerned, is now considered void. The men are advised by their representatives to stay at work pending action of the Iron Molders' Union officers.

LABOR NOTES.

After being out on a strike since the middle of January, 1904, the molders of the plant of the Wellman-Seaver-Morgan Co., Akron, O., went to work Aug. 17 on the company's terms.

Comptroller of the Treasury Tracewell and several representatives of the union machinists employed at the Washington navy yard had a conference last week with President Roosevelt on the question of a Saturday half-holiday for the machinists. The President some time ago decided that the men were entitled to a half-holiday and it will be granted.

The strike of the molders at the D. Clint Prescott Co.'s foundry, Menominee, Mich., has been settled. The men went out about six months ago owing to a dispute concerning hours of labor, and they now return at the same hours and same wages that they had before the strike.

An agreement has been signed by the Iowa Central railway and its machinists, settling their differences for the present. The temporary agreement will expire Nov. 1.

Notice of 10 percent reduction in wages, to take effect Sept. 1, has been posted in the shops of the Rogers Locomotive Works, Paterson, N. J., where 1,200 men are employed.

LOSS IN MALLEABLE FOUNDRIES.

BY R. F. FLINTERMAN, CHICAGO.

It may be of interest to see in detail the results of a number of test heats lately made at McCormick Works, International Harvester Co., to determine the amount of loss and shrinkage in malleable work. The melting was done in ordinary air furnaces. In tables Nos. 1 and 2 it is shown in detail how the various heats were made up and also the total amount of iron recovered, both as castings and as scrap (sprue, floor riddlings, mill riddlings, etc.). The difference between total iron recovered and heat as made up gives the loss or shrinkage, this loss running from 3.36 percent to 8.03 percent.

TABLE NO. 1.

Test Heats Taken in Malleable Foundry, May 2, 1904.

	Heat No. 1		Heat No. 2		Total	
	Pounds	Per cent of Melt	Pounds	Per cent of Melt	Pounds	Per cent of Melt
Pig Iron	14,720		9,755		24,475	
Sprue	15,200		10,520		25,720	
Total Iron Melted	29,920		20,275		50,195	
Product.						
Iron from Milling Slag	159	00.53	327	01.61	486	
Scabs from Furnace Spouts	145	00.49	210	01.04	355	
Sprue (including Floor Riddlings)	12,035	40.22	7,927	39.10	19,962	
Total Scrap	12,339	41.24	8,464	41.75	20,803	
Castings (Good and Bad)	16,304	54.49	11,130	54.89	27,434	
Total Product	28,643	95.73	19,594	96.64	48,237	
Loss	1,277	04.27	681	03.36	1,958	
Slag from Skimming Heat	1,249	04.17	1,545	07.62	2,794	
Iron Recovered from Slag	159	12.	327	21.17	486	

TABLE NO. 2.

Test Heats taken in Malleable Foundry, May 19, 1904.

	Heat No. 3		Heat No. 4		Total	
	Pounds	Per cent of Melt	Pounds	Per cent of Melt	Pounds	Per cent of Melt
Pig Iron						
Car No. 61302	12,000	50.00	4,500	18.74	16,500	34.36
" " 70988			7,500	31.22	7,500	15.62
Total Pig Iron	12,000	50.00	12,000	49.96	24,000	49.98
Sprue	12,000	50.00	12,020	50.04	24,020	50.02
Total Iron Melted	24,000	100.00	24,020	100.00	48,020	100.00
Iron recovered from Milling Slag	234	00.97	266	01.11	500	01.03
Scabs at Furnace Spouts	155	00.65	250	01.04	405	00.85
Mill Riddlings	28	00.12	29	00.12	57	00.12
Sprue (including Floor Riddlings)	8,983	37.43	8,954	37.27	17,937	37.35
Total Scrap	9,400	39.17	9,499	39.51	18,899	39.35
Castings (Good and Bad)	12,673	52.80	13,532	56.34	26,205	54.57
Total Product	22,073	91.97	23,031	95.88	45,104	93.92
Loss or Shrinkage	1,927	08.03	989	04.12	2,916	06.08
Slag from Skimming above heats	1,618	06.74	1,817	07.56	3,435	07.15

It is further attempted to ascertain as nearly as possible to what cause the loss and shrinkage might be due. Below are given in detail the methods employed for determining the character of the loss due to the chemical changes of various kinds.

Mixture was made up of pig iron and sprue, the composition of which is shown in Table No. 3.

TABLE NO. 3.

	Silicon	Sulphur	Phosphorus	Manganese	Total Carbon
14720 lbs. Pig Iron	1.51	.096	.168	.693	3.72
15200 lbs. Sprue, etc	1.10	.054	.130	.388	2.56

This would make the composition of the mixture as it went into the furnace as given in Table No. 4. For sake of comparison we give also analysis of the hard iron; that is, of the finished product as it is tapped from the melting furnace. This shows plainly what changes occur and at same time shows what losses are due to such chemical changes.

This slag was carefully sampled and was found to analyze as follows:

Metallic Iron (removed by magnet)	5.20%
" " (determined by titration) part present as Ferric Oxide and part present as Metallic Iron	21.51-32.4 Ferric Oxide
Alumina	14.50
Lime	.85
Silica	51.38

TABLE NO. 4.

	Silicon	Sulphur	Phosphorus	Manganese	Total Carbon
Analysis of mixture as it went into furnace	1.30	.045	.149	.53	3.13
Analysis of Hard Iron tapped from furnace	.85	.077	.160	.33	2.55
Loss	.45			.20	.58-1.23 %
Gain		.032	.029		.061
Total loss					1.169 %

Slag Analysis.

Tr. total amount of Slag	1249 lbs.
Iron recovered by Sly Mill	159 "
Slag residue	1090 lbs.

Total iron including that removed by magnet and that determined by titration amounts to 26.7 percent, which represents iron lost and not recoverable. This accounts for 291 pounds (26.7 percent of 1,090 pounds) and amounts to .90 percent of total mixture.

Thus by reason of chemical changes during melting and by determining amount of iron contained in slag and not recoverable, we have accounted for the following: $1.169 + .90 = 2.069$ percent.

The total loss as per report already made (Table No. 1) amounted to 4.27 percent, which leaves 2.2 percent still unaccounted for. This loss may be accounted for in the following manner:

Our mixture as given hereinbefore contained pig iron and sprue. The sprue had previously all been rattled and may be counted as clean iron. The pig iron is, of course, more or less oxidized and also sand coated. Accepting 10 percent, as figure represented by sand present, 1,472 pounds of sand were weighed up and counted as iron.

Now, referring to Table No. 1, it will be noted that among the various products of the melt we have 1,235 pounds of sprue. This sprue as returned includes sand adhering to it. By actual test we have determined that this sand amounts to 7.5 percent of the weight of the sprue. We are, therefore, turning in as iron in our product record 902 pounds of sand (7.5 percent of 12,035 pounds) 1,472 — 902 equals 570 pounds. The other products as reported are all cleaned up before weighing. The 902 pounds of sand adhering to sprue in product partially offsets the sand weighed up with pig, but still leaves 570 pounds of sand which must have passed into slag. This 570 pounds amounts to 1.9 percent of total mixture, thus making total loss accounted for $1.9 + 2.07 = 3.77$ percent, which is within .30 percent of loss as reported.

If 10 percent is considered too high for the amount of sand adhering to pig iron, this last loss as accounted for will, of course, be reduced.

There will be further loss which cannot be determined, as for instance, the oxidized iron on inside of furnace which has passed into bottom; there may be other slight losses due to various causes. However, losses other than those accounted for cannot be very great. It would appear, therefore, that the loss of 4.27 percent is about right.

Concerning figures as herein given will say that the analysis of sprue which was put into mixture was obtained by taking 10 pieces of hard iron; borings were taken from each of these pieces, the borings were mixed and then analyzed.

In order to get at the analysis of the finished product, three test bars were taken at beginning, middle and end of tap. The bars were sampled and borings were mixed and analyzed.

We add now figures for next three test heats, all sampling, calculation, etc., having been made in same manner as with No. 1 heat, which we have just explained in detail.

*Prepared for the Indianapolis meeting of the American Foundrymen's Association.

TABLE NO. 5.

Heat No. 2.

	Silicon	Sulphur	Phosphorus	Manganese	Total Carbon
6790 lbs. Pig Iron	1.51	.036	.168	.690	3.72
2985 lbs. Pig Iron	1.67	.017	.120	.737	3.60
10520 lbs. Sprue, etc	1.13	.066	.152	.349	2.77
Analysis of mixture	1.33	.048	.152	.520	3.21
Analysis of metal as tapped	1.03	.073	.160	.330	2.66
Loss	.30			.190	.55—1.04
Gain		.025	.008		— .044
Total loss					—1.007

Slag Analysis.

Total amount of Slag ..... 1545 lbs.
Iron recovered by Sly Mill ..... 327 "
Slag residue ..... 1218 lbs.

Analysis of Slag Residue.

Metallic Iron (removed by magnet) 11.7%
" " (determined by titration) 24.3
Silica 46.2

Total Iron not recoverable equals 36% of slag residue—equals 438 lbs.
The Iron not recoverable amounts to 2.1% of total mixture.

Loss due to Sand.

9755 lbs. Pig Iron (10% sand) carries ..... 975.5 lbs. Sand
7862 " Sprue (7½% sand) " ..... 589.5 " "
Difference ..... 386.0 lbs. Sand

This loss amounts to 1.9% of total mixture.

Total Loss in Detail.

Due to chemical change 1.01%
Due to iron which cannot be recovered from slag 2.10
Due to sand loss 1.90
5.01%

These figures are 1.65% in excess of loss as reported in Table No. 1.

TABLE NO. 6.

Heat No. 3.

	Silicon	Sulphur	Phosphorus	Manganese	Total Carbon
12000 lbs. Pig Iron	2.00	.025	.12	.78	3.81
12000 lbs. Sprue	1.08	.057	.16	.17	2.37
Analysis of mixture	1.54	.046	.14	.47	3.09
Analysis of metal as tapped	1.25	.057	.16	.31	2.46
Loss	.29			.16	.63—1.08
Gain		.011	.02		— .031
Total loss					—1.049

Slag Analysis.

Total amount of Slag ..... 1618 lbs.
Iron removed by Sly Mill ..... 234 "
Slag residue ..... 1384 lbs.

Analysis of Slag Residue.

Metallic Iron (removed by magnet) 14.1%
" " (by titration) 22.7
Silica 47.9
Alumina 15.4

Total Iron not recoverable equals 36.8% of slag residue, equals 509 lbs.
The Iron not recoverable amounts to 2.1% of mixture.

Loss due to Sand.

12000 lbs. Pig Iron (10% sand) carries 1200 lbs. Sand.
8983 " Sprue (7.5% ") " 674 " "
Difference ..... 526 " "

This loss amounts to 2.2%.

Total Loss in Detail.

Due to chemical change 1.05
Due to iron which cannot be recovered from slag 2.10
Due to sand loss 2.20
5.35%

Figures as reported by Table No. 2 are 2.68% in excess of this.

TABLE NO. 7.

Heat No. 4.

	Silicon	Sulphur	Phosphorus	Manganese	Total Carbon
4500 lbs. Pig Iron	2.00	.025	.12	.78	3.81
7500 lbs. Pig Iron	2.46	.013	.14	.79	3.48
12020 lbs. Sprue	.99	.076	.17	.25	2.21
Analysis of mixture	1.64	.045	.15	.52	2.90
Analysis of metal as tapped	1.33	.055	.15	.31	2.67
Loss	.31			.19	.23—.73
Gain		.01			—.01
Total loss					—.72

Slag Analysis.

Total amount of Slag ..... 1817 lbs.
Iron removed by Sly Mill ..... 266 "
Slag residue ..... 1551 lbs.

Analysis of Slag Residue.

Metallic Iron (removed by magnet) 18.5%
" " (determined by titration) 19.7
Silica 43.2

Total Iron not recoverable, 38.2% of slag residue, equals 592 lbs.
The Iron not recoverable amounts to 2.4% of mixture.

Loss due to Sand.

12000 lbs. Pig Iron (10% sand) ..... Carries 1200 lbs. Sand
8954 " Sprue (7½% ") ..... " 671 " "
Difference ..... 529 " "
This loss amounts to 2.2%.

Total Loss in Detail.

Loss due to chemical change ..... .72%
" " " iron which cannot be recovered by 2.40
Sly Mill 2.20
Loss due to sand loss 5.32

This figure is 1.2% in excess of loss as shown by Table No. 2.

TABLE NO. 8.

Recapitulation.

	HEATS				Average
	No. 1	No. 2	No. 3	No. 4	
Loss due to chemical change	1.17%	1.01%	1.05%	.72%	.98%
Loss due to iron not recoverable	.90	2.10	2.10	2.40	1.87
Loss due to sand loss	1.90	1.90	2.20	2.20	2.05
Total loss	3.97	5.01	5.35	5.32	4.90
Total loss as shown by tables No. 1 and 2	4.27	3.36	8.03	4.12	4.94

These figures go to show that 5 percent loss should be about maximum loss for our practice. While there is more or less lack of correspondence in results as obtained, the results are nevertheless near enough alike to show that a loss of 8.03 percent, as shown on No. 3 test, cannot be right. This excessive loss must be due to some error in weighing back product of melt, since there is nothing in analysis of figures of this heat to account for loss being so much higher.

The Anderson, Ind., plant of the American Steel & Wire Co. resumed operations Aug. 22. The plant was closed down about three months ago, and since then repairs have been made.

The molding department of the Sharon, Pa., plant of the American Steel Foundries Co. will be given additional capacity by the erection of an extension 50 x 52 feet.

The North Sharon, Pa., plant of the Carnegie Steel Co. has resumed operations in part, the skelp and blooming mills being on in full. The other departments continue idle, however, and there is little indication that they will be operated in the near future.

The Rankin plant of the McClintic-Marshall Construction Co., Pittsburg, is now operating double turn. Orders for a large amount of structural work have recently been booked and the capacity is well taken up for several months.

ACCIDENTS FROM ELECTRIC CRANE CURRENTS.

The electrical connections to the overhead cranes in shops contain possibilities of danger and occasionally a fatality occurs from this source. A workman at a Columbus, O., power plant ascended to an overhead crane and while waiting for the machine to be put in operation leaned backward against the wall and came in contact with a switch carrying a 500-volt current. The accident happened this week and resulted in death. The gradual adoption of electrically-driven cranes in shops renders the question of safety a matter of importance. A report issued by the government inspector-in-chief of electrical apparatus used in the manufacturing plants of England has some comments on electrically-operated overhead cranes. He points out that the number of accidents from shock is large in proportion but is due entirely to the neglect of proper precautions. The confined space on the platform, the proximity of metal posts forming good conductors for the energy, which may by leakage become dangerous to the crane operator.

The inspector reports sundry instances of this kind. In one case the crane as a whole became charged with a 200-volt alternating current. The machine was employed in handling boiler plates and the men at work on the floor and engaged in guiding the plates were unpleasantly acquainted with the electrically charged metal. They called the attention of the man at the crane and he attempted to leave the platform but received a shock rendering him insensible, though he fortunately did not fall to the ground. The frames of motors and resistance boxes, hand rails, etc., could be "grounded" as is commonly the case where the building is of steel construction and the runways of the crane are not laid on timbers. The "grounding" of the parts which are not intended to act as conductors in the ordinary working of the crane can be thoroughly applied by the bonding of the rails and in other ways insuring a complete connection from metal to earth.

One accident arising from an error of judgment on the part of the operator is suggestive of the constant necessity for cautious action by the attendant. The electric current had been unexpectedly cut off from the crane and the workman left the platform to make an examination. He found that one of the trolley contacts had run off the wire. He replaced the contact and the crane at once moved, crushing him to death. The unfortunate man had omitted to open the main switch prior to leaving the operating position. The fatality led to the adoption of a safety switch actuated by the door or gate to the platform. The workman cannot leave the crane without throwing the switch and thereby breaking the electrical connection. Just how this end is attained is not described in detail but presumably the door or gate locks on the inside and withdrawing the bolt would free the entrance and shut off the source of electrical energy. The current could not be again renewed until the workman re-entered and assumed his position with the door locked as before.

It is pointed out that the alternating current has been found dangerous at low pressures. The four fatalities enumerated in the report were all from alternating currents and the greatest pressure recorded was only 440 volts. A peculiarity of the injuries from these causes is in the varied effect upon those subjected to electrical shocks. One of the instances given is of a three-phase alternating current at 550 volts. The accident resulted in the death of two men and others received more or less severe shocks and burns. The men killed were scarcely marked at the point of contact but another man had the flesh on his fingers burned away to the bone and he was rendered unconscious from prolonged shock. He subsequently recovered, however. It would appear that the severe burns indicate complete contact of the body and the source of electrical potential, but these do not invariably involve the death of the sufferer despite the intensity of the current. Three accidents have happened on a three-phase system of 6,500 volts and none of these was fatal. Two resulted in severe burns, however. In the one case a thumb rested on the conductor and during the shock which lasted a full minute—according to the *Mechanical Engineer*—the thumb was severed from the hand. The current was "grounded" though the victim as he stood on a concrete floor and the toes of both feet were burned off. Nevertheless the man escaped with his life, though the contact was complete and the strength of the attack was such as to make it dangerous in the extreme. The comparative immunity from injury in shops from stray currents is strong testimony to the excellence of electrical apparatus and its close conformity to the standard set by underwriters in this country.

OBITUARY.

J. F. Casey, one of the leading manufacturers of Chattanooga, Tenn., died Aug. 15 after an illness of nearly two years. Mr. Casey was born at Yellow Springs, O., in 1855 and was admitted to the bar at Springfield, O., where he practiced 10r several years successfully. He removed to Chattanooga in 1888 and formed a partnership with M. M. Hedges, and in 1889 bought the old Union Iron Works, which were then in the hands of a receiver. Soon after the Casey & Hedges Mfg. Co. was incorporated. In 1893 the company erected the plant which is now operated. One year later Mr. Casey and Mr. Hedges organized the Chattanooga Pipe & Foundry Co., of which concern Mr. Casey was president. Under the will of Mr. Casey his properties are left absolutely in the hands of Mr. Hedges.

James A. Vining, general superintendent of the Whitman & Barnes Mfg. plant of Akron, O., died Aug. 18. He was 47 years old.

Henry Foerster, for nearly 40 years engaged in the tool manufacturing business, died at his home, Newark, N. J., Aug. 16, age 69. He came to this country from Germany in 1849 and settled in Newark, where he became connected with the firm of Henshel-Krautter Co. He became a partner in 1864, and in 1889 became sole owner.

Charles Ranlet died at Worcester, Mass., Aug. 16, age 43. He was born in Holyoke, Mass., in 1861, graduated from the Philips Exeter academy in 1879 and from Harvard in 1883. He was for a number of years connected with the Holyoke Machine Co., first in Holyoke and later in Worcester. He was later connected with the Washburn & Moen Mfg. Co., and after its consolidation with the American Steel & Wire Co., he was appointed treasurer of the Worcester branch.

Christian E. Anderegg, president of the National Wheel Co., Indianapolis, Ind., died suddenly Aug. 16, age 68 years. He was born in Pittsburg, and before moving to Indianapolis conducted wheel works at Lawrenceburg, Ind.

Personal.

Dr. Hans Goldschmidt, president of the Goldschmidt Thermit Co., New York, will sail for the United States on Aug. 23 by the steamer Moltke. He comes to this country as the delegate of the Bunsen Society and as such will attend the International Electrical Congress at St. Louis in September. He has been invited to address the congress on his invention, "Alumino-Thermics," and will deliver an evening lecture with numerous demonstrations. Provisionally the date has been fixed for Sept. 13, in the hall of the Westinghouse Co.

Jos. Harrison, for 30 years foreman of the Allis-Chalmers foundry, in Milwaukee, has accepted a position as salesman for the J. D. Smith Foundry Supply Co., Cleveland, to travel in Wisconsin, Minnesota and Michigan.

Stephen Wright, formerly with the Dutcher Steel Co., Milwaukee, has accepted a position with the National Electric Co., as superintendent of their iron, steel and brass foundries.

John B. Austin, yard superintendent of the Lackawanna Steel Co., Buffalo, has resigned to accept the position of engineer of maintenance of way with the Long Island railroad.

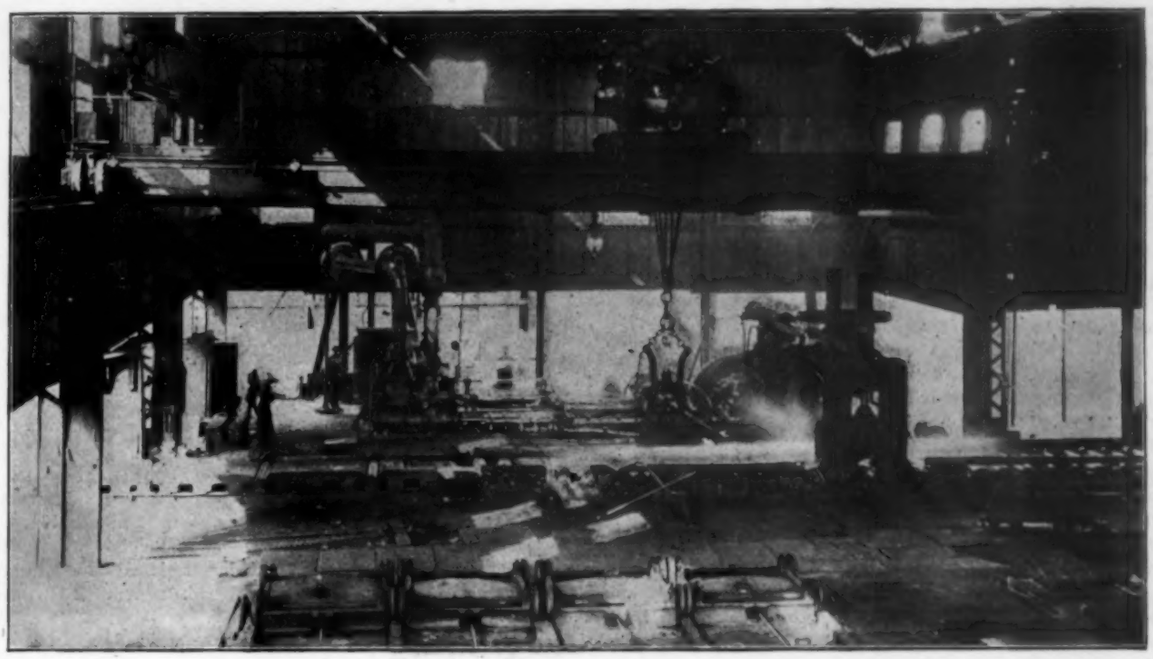
Scott Clingam, who has had charge of the shipping department of the Valley plant of the Republic Iron & Steel Co., Youngstown, O., has been appointed superintendent of that plant, to succeed Michael Conroy, resigned. Frank Cunningham succeeds Mr. Clingam.

Peter Klein, a union picket arrested for intimidation and as a suspect in a supposed plot to wreck the Vulcan Iron Works, Chicago, with dynamite, pleaded guilty to the charge of storing dynamite within the city limits, in violation of the city ordinances, and was fined $50 and costs. On the charge of intimidation Klein asked for a continuance, and the hearing was set for Aug. 23.

THE CASE INGOT CRANE.

A crane intended especially for the handling of ingots is manufactured by the Case Mfg. Co., of Columbus, O. Its design is such that it requires but 10 feet head room, this feature making it possible to install the crane in buildings with limited space above the running rail. The girders are of the standard web type construction, arranged to be bolted to end trucks. The latter are built up of channels securely bolted together by means of cast iron separators. The truck bearings are of M. C. B. type. The mechanism provided for rotating the frame is through a worm on the end of the armature shaft of the motor in mesh with a worm wheel mounted on top of a vertical shaft, the bearing of which is a part of the upper frame. On the lower end of the shaft there is a spur pinion, the teeth of which engage in the circular rack on the lower portion of the frame. Large steel balls running in circular grooves immediately above the circular rack furnish a bearing which enables the upper frame with its mechanism to be revolved with great ease of operation and under excellent control. The chains suspending the tongs are so hung as to insure uniform rotation of the tongs with the upper frame of the trolley.

The hoisting and lowering mechanism consists of two drums, upon which the chains are wound, driven by a special motor. The transmission of power, it will be noted, is by means of spur gearing. For the purpose of opening and closing the tongs there is another drum, also actuated by means of a solenoid. Everything in connection with the various functions of the trolley is under control of the operator, as well as the movement of the crane itself along its runways and the movement of the trolley over the bridge.



INGOT CRANE OF THE CASE MFG. CO.

The standard ingot size cranes are built to handle three tons on the ingot hoist. In order, however, to provide for handling other work about the plant, the machines are equipped with an auxiliary hoist of much greater capacity when desired. One of these cranes is installed in the open-hearth plant of the Grand Crossing Tack Co., which was described in *The Iron Trade Review* of Aug. 4. The Case ingot crane is also in operation in the plants of the Republic Iron & Steel Co., Youngstown, O.; American Steel & Wire Co., Cleveland, and the Columbus, O., works of the Carnegie Steel Co.

The second blast furnace of the LaBelle Iron Works, Steubenville, O., is now fully completed and is ready for operation at any time. No definite date has been fixed for blowing in this stack, but the indications are that the two furnaces will be required to furnish iron for the steel plant in the near future. With both in operation sufficient iron will be produced to meet the requirements of the open-hearth plant.

Lake Superior Mining Institute.

The tenth annual meeting of the Lake Superior Mining Institute occurred at Ironwood, Mich., on the Gogebic range, and at Milwaukee, Wis., on Aug. 16, 17 and 18. Not so many were present as would have been the case if the meeting of the American Institute was not to take place at Duluth next month, and fewer than have usually been at these northwestern sessions. The meeting was, however, very enjoyable and profitable for all who could attend. At the evening session of Wednesday the following officers were elected:

President, O. C. Davidson, Iron Mountain; vice presidents for two years, Fred M. Prescott, Milwaukee; M. M. Duncan, Ishpeming; F. W. McNair, Houghton; managers for two years, John C. Greenway, Ishpeming; William Kelly, Vulcan; H. B. Sturtevant, Hibbing, Minn.; secretary, A. J. Yungbluth, Ishpeming; treasurer, E. W. Hopkins, Commonwealth, Wis.

The annual report of the council showed the institute to have an active membership of 371, not including 57 in arrears for one year's dues, 3 honorary and 1 life member. Dr. James Douglas, of New York, president of the Copper Queen Consolidated Mining Co., was elected to honorary membership, and applications for 35 new memberships were favorably acted upon. The treasurer's report showed a balance of $2,908.82. This made a net gain for the year of 61 members, prior to the addition by election, and of about $1,000. At the meeting the institute passed a resolution thanking the Milwaukee committees, the Gogebic mining companies and the Chicago & Northwestern and Wisconsin Central railway companies.

Members came together at the Curry hotel, Ironwood, Tuesday morning, Aug. 16, and the day was spent visiting mines about that city, Hurley and Gile, the group of mines visited being the Ashland, Norrie, Aurora, Pabst and Newport, all lying within about three miles from Ironwood, and the Germania, Windsor, Cary, Superior and Ottawa. Aside from Ashland, belonging to the Cleveland-Cliffs Iron Co., and Newport, belonging to Ferdinand Schlesinger and associates, the Ironwood mines visited are under the control of the Oliver Iron Mining Co., the ore end of the United States Steel Corporation. Chief point of interest was the new A shaft at Norrie mine, which has been under way above two years and is now down in the footwall a trifle more than 1,000 ft. This shaft is steel lined, 6 by 23 ft. inside timbers, and dips at an angle of 58 deg. Members of the institute were especially interested in the steel lining adopted here,

which differs slightly from anything of the kind ever before attempted. The shaft contains two skip compartments, each 6 by 6 ft., one cageway of the same size and one 4 by 6 for ladder, counterweight and pipes. It is lined except for the upper 20 ft. with steel sets and wood lath. Wall plates are composed of 30-lb. rails, the end pieces of 25 and 30-lb. rails and the dividing pieces of I-beams and channels, varying from 3 to 4 in. Old rails are found more convenient than beams for end pieces and are cheaper. The various members of the sets are connected by angle bars secured by rivets. Studdles are merely 4-ft. pieces of 16-lb. rails, or scrap of other size, with ends slotted for connection. Slots in the studdles fit over flanges in the wall plates in such a manner that they cannot be knocked out by pressure except by force that will actually bend them sharply. In this shaft, in order to facilitate swinging plates into place, and because the ground is soft, they are divided into two pieces. There are about 1,850 lb. steel in each set of this shaft. Wood lath is found necessary at this shaft, while at the new Pioneer B, also of steel, old wire ropes are hung behind the props. In sinking this shaft it has been found that the difference in area, made up from the thinness of the steel members, amounts to a saving of about 21 percent over a shaft having the same inside area. But it also found that the gross cost of sinking a shaft of this character is about $7 or 13 percent greater than if wood timbered in the usual manner.

The first shafts sunk in the Ironwood district were put down in 1884, and all were directly on the ore. Of course this resulted in leaving immense bodies of ore for supports of the shafts. Later shafts were sunk in the hanging, but now every new work is put into the quartz-slate foot, well back from the ore, below the vitreous quartzite of the footwall, and near the center of this horizon. This puts shafts about 250 feet from the ore horizon. Most of the shafts, especially those in mines of the United States Steel Corporation, that are closer than this to the ore will probably be abandoned, though No. 1 Aurora is in slightly different condition and may be saved. Aside from A shaft, Norrie, three others at Ironwood are using steel to a greater or less extent.

At K shaft, Newport mine, a hoisting plant capable of hoisting a 10,000-lb. load unbalanced from 2,000 ft. is going in. There is a 6-ft. drum with straight face and the cylinders are duplex, 20 by 42. The efficiency of this plant is to be high. This shaft is now down 1,600 feet.

No. 3 shaft at East Norrie, also going down in the footwall, was visited, but as it presents few new features little time was spent there. It was interesting to note, at all the properties visited, that the development work done and the permanent improvements put in, are all of the most substantial and lasting character, far more so than in the past and evidently designed for the utmost service and the longest possible duration. It is one of the developments coming from the control of mining properties by companies having abundant capital and assured of a large and permanent product.

It was remarked that stockpiles at the Norrie group of mines were still very large, though the season is well along. There are now in stock at these mines about 500,000 tons of ore, much of which was the product of the early part of 1903. From the number of steam shovels at work in these stocks it is evident that the company proposes to move a very large part of this ore during the present season, but there will doubtless be considerable left over at the close of navigation. Ore on surface at Ashland and Newport is proportionately less and actually very much less. These mines were closed down during a portion of the early months of 1904.

President G. H. Abeel, in his annual address, on the consumption of iron and steel, spoke briefly of the increase of recent years in the mining of iron ore on Lake Superior, and figured the consumption of the United States at 504 lbs. per capita, while that of the globe, exclusive of the United States, Great Britain and Germany, is about 24 lbs. "Consumption," he said, "depends on cheapness and familiarity of the possible consumer with the uses of an article. Prices of steel are now such that it can be delivered anywhere on the globe at a figure that can be no serious bar to its use. The important element is that as civilization progresses peoples that have not been accustomed to the use of iron shall be made familiar with it, and this work of teaching falls mainly upon the countries that are chief producers." He referred to the destruction caused by strikes, and to the demand for better and more fireproof construction resulting from recent accidents, and closed with the statement that "in no particular does the work of those who have steadily cheapened the cost of iron and steel so appeal to us as among the highest human achievements, as in the means they have provided for the protection of life against the most destructive elements."

Considerable new work is under way at other portions of the Gogebic range, but there was not time to inspect it, and in the evening a session for the reading of papers was held. Special trains of the Chicago & Northwestern and Wisconsin Central roads took the party to Milwaukee, arriving there Wednesday morning. Special cars on the electric lines were taken to West Allis, where are the works of the Allis-Chalmers Co. and the Fred M. Prescott Mfg. Co. Both these plants were thrown open to the visitors, many of whom are large purchasers of mining, pumping, milling and ore dressing machinery. Luncheon was served at the workmen's lunch rooms of the Allis works. Here and at the works of the Prescott company officials were on hand to show the visitors about and the utmost attention was given them, so that everything of interest was seen. At the Prescott works a pour of 25 tons of metal was a feature of entertainment.

In the afternoon the business session was held and in the evening an elaborate banquet was served at the Plankington hotel by the Milwaukee committees to the visitors and invited guests. This banquet was a pleasant feature of the visit, as was the reception and concert offered by the Milwaukee committees.

At the banquet of Wednesday evening J. W. P. Lombard acted as toastmaster and Mayor Rose gave the welcoming address. Other responses were by Congressman W. O. Young, of Houghton, Mich.; William Kelley, of Vulcan, Mich.; Graham Pope, of Houghton; Peter White, of Marquette, Mich.; Capt. I. M. Bean, Fred M. Prescott, and E. H. Bottum, of Milwaukee. Others at the speakers' table were W. J. Olcott, President O. C. Davidson, ex-President George H. Abeel, M. M. Duncan, F. G. Bigelow, H. P. Eells, Secretary A. J. Yungbluth, W. Fitch, Ferdinand Schlesinger, E. W. Hopkins, F. W. Sivyer, John H. McLean, W. J. Richards, H. R. Sturtevant, J. M. Thomas, S. S. Curry, J. P. Murphy, J. R. Thompson, Frank P. Eyrman and E. E. Scribner.

Thursday the party visited the works of the Nordberg Mfg. Co., at South Milwaukee, whose machinery is in use at a great many copper mines of the Lake region. They also inspected the plant of the Bucyrus Co., and saw the construction of steam shovels. A trip was made to the Semet-Solvay coke plant and many of the visitors took in the Bay View works of the Illinois Steel Co. The home trip was made Thursday night. About 125 members of the institute were in attendance at the meeting.

Shaft Sinking Through Quicksand.

The paper of H. B. Sturtevant on "Shaft Sinking Through Quicksand at Susquehanna Mine, Hibbing, Minn," was as follows:

Conditions at this property were a surface of 138 ft., of which 57 ft. were in dry sand, 50 ft. in quick and 31 ft. in hardpan. A small shaft, to be used as permanent drainage and timber shaft, and for the immediate purpose of draining the surrounding ground where the main shaft was to be sunk, was started Feb. 15, 1903. This was calculated for a size of 8 x 10 ft. inside timbers, timbers 12 x 12, studdles 3 ft., and hanging bolts 1¼ in. The shaft bearers were 20 to 24 in. diameter and 32 ft. long. At the depth of 45 ft. 6¾ in. wire ropes were used to hang the shaft from the bearers and at the depth of 57 ft. water and quicksand were encountered. As there was considerable pull on the ropes, we built two trusses at the collar of the shaft, using the bearers as the lower chord of an ordinary queen post truss. From 57 ft. the drop shaft method was used. A shaft set was beveled to an edge on the outside of the shaft and placed in position and forced down; filling in other sets above it and under the jacks successively, bolting timbers to each other, and hoisting the sand and pumping the water. In this manner we sank 15 ft., but could go no further and the operation was repeated until a depth of 85 ft. was reached.

I speak now of what we did; but the experience was valuable, and we modified the method later in sinking the operating shaft, to be mentioned further on.

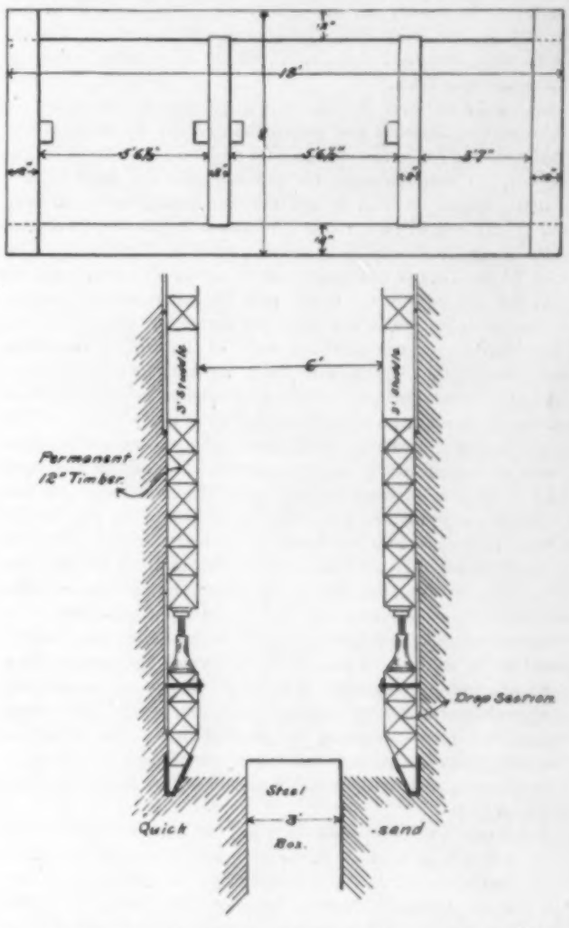
At 85 feet depth the pressure of sand being very great, and difficulties increasing, we reduced the size to 6 x 8, building up inside the shaft a solid box with bottom edge beveled, but flush on outside, and this solid box was forced down 22 feet to 107 feet and bedded in hardpan. At 85 feet the timbers were anchored to the collar trussed bearers by four ropes 1¼ inches, thus making all told ten wire rope hangers, besides the usual iron hangers. At 107 feet the timbere were again anchored by wire ropes. The enormous strain on the shaft timbers due to quicksand was manifested by the washers 8 x 8 inches pulling into the bearers fully two inches. During the entire process we forced in advance of the timber a sheet steel box 3 x 5 feet of 1¼-inch plates, put together with angle irons, and ten feet long. This box was forced down in the middle of the shaft and served partially to drain the bottom, and to serve as a sump for the pump suctions.

Progress in quicksand was very slow, and 8 to 10 feet per month was all we could do, the rate varying from nothing to 6 inch per day. We found, as others have, that the great danger to success lies in the sand and water bubbling through under the bottom timbers. To prevent this the sand was not removed faster than necessary, and when bubbling was indicated a plank hewn to edge on end, or a shovel was used, and water allowed to raise a few feet; further, during the entire work in quicksand we ran eight hour shifts, work progressing continuously in order to hold what we had made. And to avoid trouble over the idle Sunday, the sand was not removed at bottom and water was allowed to raise to the pumps. In hardpan below 107 feet depth the process used was driving lath, removing ground, and placing timbers, bolting them together. Sinking progressed in clay at the rate of 1½ feet per day, until the shaft was opened on ledge of ore at 138 ft. on Sept. 14, or seven months from date of beginning. The drainage increased to 300 gallons per minute on July 1 at 90 feet depth and 450 gallons at 138 feet. Duplex sinking pumps were tried but were unsatisfactory, because of jumping in case of air in the suction, and No. 10 Camerons were substituted. The shaft is only two feet out of the plumb, but this does not impair its serviceability for pumping and timber.

In sinking it was found necessary to use great care to maintain the bottom edge of timbers exactly level in quicksand or the shaft would sink out of plumb. The water would occasionally make cavities which would fill suddenly producing a great strain on timbers and hanging ropes, and there would be no way of anticipating this, and as the timber was solid there was no way to inspect behind them. Anticipating these troubles we would, while sinking ram hay behind timbers, and the effect was to prevent dirt washing down on the outside of the shaft. It is also very necessary in sinking in quicksand to hoist no more sand than possible; that is to say, the sand will try to run into the shaft under the timbers, and if removed too fast the sand outside the shaft will become loosened and run, and cause timbers and irons to break and the whole work ruined irreparably. On one occasion we noticed unusual bubbling and we immediately stopped the pumps and allowed the water to raise 15 feet and then lowered sand from the surface and filled the shaft several feet in which condition it stood, efforts to resume being without success for six days, when sinking was resumed.

The hoisting shaft was begun July 28 at 40 feet distant east from the drainage shaft. The size was 6 x 16 feet inside, with usual timbering, to the water line. It was found that the drainage shaft pumps had drained the ground at the hoisting shaft to such an extent that a No. 7 Cameron working slowly handled the water. The same difficulties were encountered as at the drainage shaft, but in lesser degree, and we are satisfied that had we not partly drained the ground by the small shaft, it would have been impossible to sink the large one, because the troubles are in proportion to the external dimensions. The method in the quicksand in the hoisting shaft was quite different from that used in the drainage shaft, and particular attention is called to the following details, as we consider the method a most successful one, and not, so far as we can learn, one which has before been used. A drop section of shaft timbers of full size of shaft was framed and placed in position. It is 4 feet in depth, made of 12 x 12-inch timbers bolted together and braced. The lower two sets are beveled, flush outside, and a ⅛-inch plate of steel shaped to fit the edge was fastened by spikes, making a shoe or edge 3 inches wide to cut the sand. On the outside of this drop section was bolted a sheeting plank with lower edges hewn thin for less resistance to sand, and the upper ends of plank extending 3 feet 6 inches above the timbers, as indicated in sketch, and behind the last permanent shaft timbers. Twenty or thirty jacks, 2½ by 18 inches were operated between the drop section and the last permanent timbers, the plank sheeting serving to retain the sand. As the jacks forced down the drop section they were removed temporarily and timbers placed and bolted to the last permanent timbers; and to bring the permanent timbers close together pockets were cut out for nuts and washers. In other words, as the jacks forced down the drop section the permanent timbers were placed above the jacks and this process was continued until the iron shoe was imbedded in clay at 107 feet, after which we drove lath and after removing the ground put in timbers.

As this was to be the hoisting shaft it was very necessary that it be vertical and truly in line without serious variation. The greatest possible care in the use of jacks was necessary



SINKING A SHAFT IN QUICKSAND AT SUSQUEHANNA MINE.

to success in this particular. The greatest variation from vertical is only six inches. As an additional protection against a crooked shaft we placed 8 x 8-inch diagonal braces at each end from the collar of the shaft down to depth of 85 feet. The necessity of these braces might be questioned, but my experience in the drainage shaft where the washing away of sand behind the timbers and the caving causing the entire shaft to surge several inches prompted us to take no chances. The shaft timbers were hung by wire ropes from the bearers at collar of shaft, but it was not necessary to truss the bearers as in the case of the drainage shaft. As an improvement I might suggest substitution of steel sheeting for the plank as less liable to break or get loose—and further the steel would, being thin, allow the drop section to cut the sand easier.

We sank the shaft through the quicksand at the rate of 8 feet 6 inches to 9 feet 6 inches per month working continuously, excepting Sundays. On reaching hardpan on Jan. 1, we

sank at the rate of about 1½ feet per day. As to speed of sinking in quicksand we shall not boast, but we modestly claim success in continual progress and that we did not lose either shaft; neither did we lose headway gained, excepting on the occasion mentioned above, and further our hoisting shaft has a variation of only six inches.

In conclusion will say that for our conditions and with 50 feet of quicksand I can suggest no improvement over the methods used at our hoisting shaft. However, if the quicksand were one hundred feet deep the difficulties would increase and it is probable that the freezing process might be more successful and more rapid, although the method described could be used. The essential feature of our success was the solid drop section with steel shoe and with back lath well secured and extending upwards to span the open space occupied by the jacks.

Upper Peninsula Iron Lands.

The paper of Robert S. Rose was on the "Geology of Some of the Lands in the Upper Peninsula of Michigan," and was to exploit lands owned by the Michigan Land & Iron Co., an important fee owner of the region. This company's lands are located in the Negaunee, Ishpeming, Michigamme, Crystal Falls and Mansfield formations, in all of which producing mines are now open.

Mr. Rose referred briefly to the geological formation of these several districts and stated that, so far as previous exploration was concerned, the ground might be considered virgin territory. Champion mine, for instance, was due more to persistent exploration than to any peculiar geological conditions, and at any one of half a dozen localities in the hard ore belt there might be shown up as good a mine as Champion. The work of the United States geological survey has been so thorough on the Marquette range that the maps locate roughly all the lands on which the hard ore formation may be found. Only two mines are working west of Ishpeming—Republic and Champion. The former owes its existence to peculiar geological conditions; the other, to persistent exploration in a regular formation, no more bowed than at many points of the belt. At many prospects small lenses of clean ores have been found at comparatively shallow depths, but nothing has been done in the way of work to prove their depth and size. As far as present information goes, the limonite ores in the Michigamme slates are in a somewhat persistent horizon on a foot of black graphite slates varying in thickness from 300 to 1,000 feet. This slate in turn lies on the Ishpeming formation, characterized by strong magnetic attraction in places and occasional outcrops of magnetic schist. The limonite ores are supposed to lie in folds of the slates. This ore horizon lies in a line of feeble magnetic attraction which is sometimes totally obscured by the stronger attraction of the Ishpeming formation. Ores occurring in pitching folds will doubtless continue to great depths, and mines abandoned in the early days as exhausted will be liable to show new lenses if properly explored.

Reference was then made to the Humboldt-Champion district, in towns 47 and 48, range 29, where there are two lines of magnetic attraction, the northerly one through North Phœnix, Pascoe, Hortense, North Champion and Bessie mines, the southerly through Northampton, Marine, Phœnix and Gibson mines. All these are small properties and most are now idle. Bessie mine, in section 35-48-29, is working in a deposit of limonite ore that occurs in an eastward pitching fold of the Michigamme slates. The line of magnetic attraction shows that a continuation of this ore body may be expected on the southeast quarter of the section. On the northeast quarter there is a sharp bend in the formation and a most favorable location for exploration is developed. Several other points that, in Mr. Rose's opinion, should be explored were referred to in his description of this district.

In the Michigamme district, a limonite formation, no especial geological feature is to be noted, excepting a continuous diorite ridge that runs north of and parallel to the iron formation. These sections, 21, 23, 25, 27, 29, 31, 33 and 35 T 48, R 30, are all underlaid by the Ishpeming and Negaunee formations, and ore may be expected on any of them. Section 7 is the extreme western end of the lower Marquette rocks as far as they have been traced by any of the geological surveys, but the iron formation probably extends in a west-northwest direction across the north part of 48-32, southwest part of 49-32 and south part of 49-33, etc. In 4831, sections 25 to 35 show outcrops of the mica slates and schists of the upper Michigamme, and while very little prospecting has been done on any of them there is a good chance for ore. The north soft ore formation is well defined west of Michigamme, and has been opened at various points, notably at Beaufort and Ohio, now working, at Imperial, Webster and Titan. The large area of Michigamme slates compressed into many folds south of Lake Michigamme makes many favorable places for exploration.

In L'Anse district the only mine worked is the old Taylor, which shipped about 30,000 tons of non-Bessemer ore that ran from 55 to 60 in iron. A complete analysis of samples recently taken is as follows: Fe, 58.90; phos., 0.219; si, 6.42; mn., 0.67; lime, 0.321; mag., 0.306; al., 0.83. The ore body was from 35 to 40 feet wide and the deepest shaft was only 150 feet. The ore is a mixture of a soft red and blue hematite and limonite formation, is similar to that of the eastern mines of the black slates, but on account of the frequent occurrence of bunches of soft red hematite, it seems to be the connecting link between the Marquette and Crystal Falls ranges in the upper Huronian slates. Section 9-49-33 is almost entirely underlaid by the iron formation, and indications are for at least three parallel folds running completely across the section, and in any one or all of these folds there may be merchantable bodies of ore. The mixed ore, as shown by pits, is about 200 feet wide, and if the fold is a deep one, large ore bodies are almost sure to exist. In the south half of 7 good float is found and the magnetic attraction is excellent. The same may be said of sections 3, 5, 17 and 19. Considerable exploration is now under way in L'Anse district near old Taylor.

In Republic district considerable exploration has been done by drills and otherwise. Mr. Rose questions the accuracy of the results of drill exploration by the Algoma Commercial Co., that at the depth of 2,475 feet seemed to cut the bottom of the formation and was in the underlying diorite. He thinks that this hole, which was not tested for verticality, may have been deflected, as were all of the Channing holes, put down in the same region ten years before. If this Clergue hole was not vertical there is a chance of finding ore in this fold. The Algoma company also did some sinking, but stopped work when a few feet from ore, according to Mr. Rose. The formation has been located in 29-46-30, the magnetic line in the north part of 45-30. In many sections of this formation the magnetic lines are marked and in some there are old mines and newer prospects. Of a good part of the district very little is known as to the geology. By piecing together magnetic observations of several observers a new oval has been made out that embraces the northwest part of 46-31, the southeast part of 47-32, the southwest corner of 47-31, and the northeast part of 46-32. The interior of this oval is high, with no outcrops, and it is impossible to tell without exploration whether the central core is granite or greenstone; but this magnetic line doubtless represents the hard ore formation.

Lands in the Crystal Falls district are near Dunn mine, where the iron ore formation has been proved up by numerous pits, but no deep work has been done. These lands have a chance of carrying the Mansfield Bessemer formation and the line of contact between the Hemlock diorite and the Randville dolomite has been accurately laid down. Certain explorations show that the greenstone forms the hanging wall of a jasper chert iron formation that has for a foot the Randville dolomite, and this must be the Mansfield formation, which is very soft and therefore rarely outcrops.

The ores of Amasa are soft red and brown non-Bessemer hematites. The formation is chert and jasper below a hanging of black, pyritiferous slate, with a foot of sometimes magnetic black slate grading down to the hemlock greenstone. The formation is magnetic and has been located where quite heavily covered with drift by the United States survey by means of dial and dip compass. Several lands are recommended by Mr. Rose for exploration in this district.

The chief value of this paper, so far as any but the intending explorer is concerned, is in the light it throws upon the statement so often made that in these older regions, especially on the Marquette range, there is no more room for the discovery of ore, as exploration has been thorough and complete. If the older regions of the Lake Superior district possess so many localities where exploration can be conducted with a fair chance of reward, as Mr. Rose believes and seems to demonstrate in his paper, there is abundant ground for the hope that for many years this region will be the scene of persistent exploration and of the discovery of many mines throughout a wide range. As the consumption of ore increases and the limits of merchantable ores set by furnacemen are lowered, it will widen the demand for new mines and will permit the exploration of many of these fields where there is now only the hope of reward and where the ores to be found are probably limonites and lean hematites.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

The Ingle Machine Co., Rochester, N. Y., has been incorporated with a capital of $10,000 to manufacture machinery. The incorporators are: A. H. Ingle, William O. Ingle and Maud E. Ingle, Rochester, N. Y.

The American Oil Engine Co., New York, has been incorporated with a capital of $250,000 to manufacture engines. The directors are: Newton Adams, H. M. Snow, J. R. Westerfield, New York.

The Bridgeport Foundry & Machine Co., Bridgeport, Conn., which has an authorized capital of $50,000 and will begin business with $2,500, has been incorporated. The incorporators are: Rollin D. Whipple, Charles N. Choate and Charles E. A. Thompson.

The Barton Boiler Co., Chicago, capital $30,000, has been incorporated to manufacture boilers, locomotives and machinery. The incorporators are: A. C. Dious, Kai Carl, Cuido Rannigar and Page V. Lyon.

The Richards Tool Co., Boston, Mass., has been incorporated with a capital of $100,000. The officers are: President, J. J. Stevens; treasurer, Olive M. Bowman; clerk, Lydia A. Brimmer, all of Boston.

The Gragert Mfg. Co., Minneapolis, Minn., has been recently incorporated with a capital of $40,000 to manufacture the inventions of E. W. Gragert, the president. These inventions include the Gragert relay pump.

Major J. F. Case, the engineer in charge of the projected Manila water and sewerage system, is at present at the Hotel Manhattan, New York. He has been in Washington for the purpose of submitting the plans to the Secretary of War. The new water supply will be brought to the city by gravity through pipe lines from the heights at the head of the Mariguina Valley, a distance of sixteen miles from Manila. The estimated cost is $4,000,000. The estimates include the following: upper dam site, pipe line 14 miles steel-riveted pipe, 42-inch diameter, 7,100,000 pounds at five cents laid, $355,000; 217,000 pounds of rivets at five cents, $10,850; reservoir, iron trestles 40,000 pounds at five cents, $2,000. Estimate for lower dam site; 12.8 miles, 48-inch steel riveted pipe, 7,565,000 pounds at five cents, $378,250; 211,000 pounds rivets at five cents, $10,550; iron trestles 40,000 pounds at five cents, $2,000.

J. G. White & Co., of New York, have let some further orders for equipment to be used in the construction of harbors at Iloilo and Cebu, Philippine Islands. The Standard Chain Co. will fill a substantial order. The Rand Drill Co. will ship pneumatic tool equipment. Fox Bros. & Co., New York, will furnish blacksmith's tools. Armstrong, Walls & Co., New York, have an order for tools. The placing of a number of orders is pending.

The charter of the Interstate Steel Co., recently organized at Rockford, Ill., has been placed on file showing the corporation to have $65,000 paid up capital stock. The incorporators are: H. C. Shattuck, A. R. Morgan and C. W. White.

The Brooklyn Woven Wire Mattress Co., Brooklyn, N. Y., has been incorporated with a capital of $15,000. The directors are: Frank Trounstine, C. Randolph Sauders, of New York City, and Aaron Prince, of East Orange, N. J.

The Reynolds Machine Co., Boston, Mass., has been incorporated with a capital of $15,000. The officers are: President, Clark Reynolds, treasurer, A. J. Seaman, of Boston; clerk, George McDowell, Somerville.

The Scranton Wrench Mfg. Co., Scranton, Pa., has been incorporated with an authorized capital of $100,000 to engage in the manufacture of tools and machinery.

The Automatic Machine & Tool Co., Toledo, O., has been incorporated by Timothy J. Sullivan, John Stahl, John Keck, C. P. Vail, A. J. McDonald.

The Brammer Foundry Co., Ironton, capital $5,000, has been incorporated by S. P. Humphrey, W. E. Brammer, A. B. Kerr, J. C. Snyder, A. T. Belcher.

The Harder Gas Furnace Co., Birmingham, Ala., authorized capital stock $500,000, has been incorporated by W. L. Harder, No. 5612 First avenue, Birmingham, 4,997 shares; O. N. Rouschenberg, 411 South Eleventh street, Birmingham, one share; Frederick Brucker, Gate City, one share; John H. Pritchard, South Twelfth street, Birmingham, one share. The officers are: W. L. Harder, president; Frederick Brucker, vice president; O. N. Rouschenberg, secretary and treasurer. The company owns the patent right for a process whereby coal is converted into gas and conducted under steam boilers to be used as fuel.

The Westinghouse Machine Co., Pittsburg, has a large number of orders on its books, and the plant is operating in full at the present time. The turbine orders under construction include two of 500-h. p. each for the Philadelphia, Coatesville & Lancaster Railway Co., two of 650 h. p. each for the Union Metallic Cartridge Co., of Bridgeport, Conn.; one of 1,500 h. p. for the Baltimore Copper Smelting & Rolling Co., of Baltimore, which are to be used in electrolytic work; one of 500 h. p. for the Parkersburg & Marietta Interurban Railway Co., of Parkersburg, W. Va., and one of 650 h. p. for the Pennsylvania Light, Heat & Power Co., of Allegheny; one of 650 h. p. for the Lewiston Water & Power Co., of Lewiston, Idaho; one of 50 h. p. for the Madison Gas & Electric Co., of Madison, Wis.; two of 500 h. p. each for the Newhouse Mining & Smelting Co., of Salt Lake City, Utah; two of 900 h. p. each for a power plant of the New York, New Haven & Hartford Railroad Co., at Warren, R. I., and one of 400 h. p. for the Northern Electric & Manufacturing Co. of Montreal, Can. Export work consists of steam engines for Colon, Central America; Iquiqui, Chile; the Panama Railway Co., of Panama, Central America; Lagua Le Grand, Cuba; Japan, and two 1,250 h. p. Westinghouse-Parsons steam turbines for the Tokyo Electric Light Co., of Tokyo, Japan. Gas engines aggregating several thousand horse power are being made for the Greensburg Gas & Electric Co., of Greensburg, Ind.; for John S. Hubbs, of Hammondsburg, N. Y.; for the Portland Cement Co., of Iola, Kan.; for the Union Forge Co., of this city; for the Union Switch & Signal Co., Swissvale; for the Warren & Jamestown Street Railway Co., Warren, Pa.; for the department of agriculture, Washington, D. C.; for the Warwood Tool Co., of Glenora, W. Va.; for the Wheeling Mold & Foundry Co., Wheeling; for the Wilmerding Electric Light Co., Wilmerding, Pa.; for the H. C. Codden Co., Columbus, O., and for the R. D. Nuttall Co., Pittsburg. Compound steam engines are getting ready for delivery to 25 different companies in various parts of the country and abroad, approximating a total capacity of 50,000 h. p., and in the Roney stoke department the material under way represents orders for no less than 123 stokers.

Fires and Accidents:—

Fire in the plant of the Tuthill Spring Co., Clinton & Seaver streets, Chicago, Aug. 18, caused a loss of $50,000.

New Construction:—

The Durable Steam Trap Co., Youngstown, O., recently incorporated with $20,000 capital, is having plans prepared for the erection of a plant at that place. The officers of the company are Lewis Quimby, president; John Morgan, treasurer and manager, and William Morris, secretary.

The Oakland Transit Consolidated Co., Oakland, Cal., will build a complete construction plant in North Oakland, at which all its cars will be built and which will replace the present scattered repair shops. The foundations are almost completed. The tract which has been fenced in for buildings has a frontage of 980 ft. with a width varying from 350 ft. to 410 ft.

The Beach Mfg. Co., Charlotte, Mich., formerly of Lyons, Mich., made its first castings in its new plant a few days ago. The company manufactures a cast iron culvert. The main plant is 90 x 155 ft. with two smaller buildings.

The Central Metal & Supply Co., Baltimore, Md., has commissioned an architect to prepare plans for a warehouse which will be 43 x 90 ft., four stories.

The city of Grand Rapids, Mich., will give a site to the American Machinery Co., on condition that the company expends at least $10,000 in buildings to be used for manufacturing purposes.

The Texas & Pacific railway is making extensive and substantial additions to the large shops at Marshall, Texas. The

erecting shop, 55 x 100 ft., is under construction. The main machine shop will be extended 140 ft., making it even with the new erecting shop. The large coach shop will be remodeled.

The Southern Steel Works, Chattanooga, Tenn., will erect a new building, 80 x 60 ft., which will be used for machine shop and foundry.

The Watkins-Skillinberger Co., of Clinton, Ia., will build a plant at Ames, Ia., for the manufacture of wire-making machinery.

The American Ball Bearing Co., Cleveland, will increase its plant by the erection of a building 90 x 200 feet, one story, plans for which have been prepared by the Cortlett Engineering Co.

The Duplex Stamping Co., manufacturer of metal specialties, has commenced the erection of a plant at Vermilion, O. It is expected to have the plant in operation by Oct. 1.

The International Gas Engine Co. will erect a plant at La Porte, Ind. The buildings include a foundry, machine, erecting and pattern shop, a large warehouse, laboratory and office. The cost will be $150,000.

The Prouty-Pierce Locomotive Mfg. Co., Armourdale, Kan., has found it necessary to increase its floor space and will build an addition to its plant.

The Klotz Machine Co., Sandusky, O., will build an addition 60 x 110 feet to its plant.

Extensive repairs, including a new lining and bosh, are being made to the plant of the Thomas Furnace Co., Milwaukee, Wis. An additional stove is to be erected and a new cast house built.

Munson Bros., Connellsville, Pa., are erecting a plant for the manufacture of the Munson warm air heater. They are in the market for an air compressor, pneumatic riveters, chain hoists and a drill press.

The Lorain Machine & Forge Co., Lorain, O., will add a foundry to its machine and forge shops.

The Andrews Wire & Iron Co., Rockford, Ill., has begun construction work on a two-story addition. Rockford cement blocks will be used.

The construction of the shops of the Scott & Oliver Mfg. Co. in Knoxville, Tenn., is progressing rapidly. One building will be 400 feet long by 100 feet wide. There will be several smaller structures.

The Berlin Machine Works, Beloit, Wis., are building important additions to the plant as follows: Machine shop, 150 x 200 feet; pattern building, 80 x 200 feet, three stories; office building, four stories; pump house with 40,000-gallon reservoir. Last year the company added to its product a line of band resawing machinery, which has become so popular that the increase of facilities for manufacturing has become necessary. The company has been very prosperous and is growing rapidly.

The Ensign Foundry Co., Toledo, O., is constructing a new brick foundry 80 x 164 feet, part of which is two stories, to be used as a pattern room. Machinery from the old plant will be installed in the new, and some new equipment will be purchased. The company makes a specialty of automobile castings, but does a general foundry work.

The Crompton-Thayer Loom Co., Worcester, Mass., is building an addition, 50 x 200 feet, which will be used as an erecting shop.

The Indiana Foundry & Machine Co., South Bend, Ind., has doubled the capacity of its plant by additions recently completed.

The Universal Caster & Foundry Co. will make important additions to its plant at Newark, N. J. The principal building will be 41 x 60 feet, three stories.

Charles Clarke & Co. will erect a shipbuilding and repairing plant at Galveston, Tex. A site about 500 x 800 ft. will be utilized for the location of the marine ways, machine shops, woodworking shops, etc.

George A. Hero and others are organizing a shipbuilding plant at New Orleans which will have a capital of $350,000. Plans and specifications are now being prepared and construction work will soon be under way. Modern shops will be built. Mr. Hero is now connected with Lehman, Stern & Co.

Bids are now being received at the Louisville-St. Louis division of the Southern Railroad for extensive improvements to the grounds and shops at Princeton, Ind. The present machine shops are to be enlarged and a large amount of new machinery will be installed.

The buildings of the plant of the Co-operative Foundry Co., Rochester, N. Y., recently destroyed by fire, will be rebuilt. The plant was not seriously crippled.

Raber & Dietman, capitalists of Sault Ste. Marie, have purchased land and are erecting a large boiler and repair shop at Boyne City, Mich. A machine shop and foundry will be built later.

A new boiler room and blacksmith shop will be added to the plant of the Rockford Boiler Works, Rockford, Ill.

Workmen for the Interstate Steel Co., Rockford, Ill., began last week building the two furnaces which will be used by the company in its new plant.

The Albany Forge, Albany, N. Y., concerning which brief reference has been made, advises us that it will erect a building 160 x 60 ft., brick and iron; forge shop about 100 x 60 ft.; machine shop, 60 x 60 ft. The entire plant will be supplied with tools, hammers, lathes, planers, slotters, etc., by the Niles-Bement-Pond Co., New York. The machine shop will be modern in every respect, all machines to be motor driven; power to be generated from a general electric 50-k. w. marine generator set. All motors will be supplied by the same company. The Albany Forge has close railroad connections, the D. & H. running into its yard, and hopes to be in operation about the middle of December. It will conduct a general forge business and will be able to completely finish its work.

General Industrial Notes:—

Owing to the refusal of the city council of Hamilton, O., to vacate a street so as to permit the Niles Tool Works Co. to increase its facilities, that company is considering the advisability of moving its plant to some other city and has already received a number of propositions from other cities. The company has not yet definitely decided what it will do.

The Manogue-Pidgeon Iron Co., Memphis, Tenn., has made a contract with the Pittsburg Steel Co. for 100,000 rods of electric weld field fencing.

Sept. 1 is the new date set for the opening of the steel plant of the Lake Superior Corporation at Sault Ste. Marie. The company has employed a number of workingmen to report on the first day of the month.

Desiring to be in closer communication with the iron manufacturing center, the officers of the Cannon Pump Co. have moved their plant from Waycross, Ga., to Birmingham, which city exempts the concern from city taxes for ten years.

The two stacks of the Columbus Iron & Steel Co. have been blown out. The company is unable to state when it will resume.

The V. & O. Press Co., Brooklyn, N. Y., which succeeded Vieillard & Osswald, manufacturers of presses, dies and special machinery, has removed from Brooklyn to its new plant at Glendale, L. I. The new plant is considerably larger than the old.

Moses Atlass' Sons, of Lafayette, Ind., dealers in scrap iron and metals, have just moved into new quarters, their yard containing almost an acre of ground. It is considered one of the best equipped yards in that section.

The Majestic Wire Works, of Detroit, which have been considering the advisability of moving to Monroe, Mich., in order to obtain better facilities, have decided to make the move.

The recent incorporating of the Crescent Machine Co., Detroit, was for the purpose of extending its regular lines of product, namely: the manufacture of pins, cigar box nails, and radiator and foundry chaplets.

The foundry plant of the defunct Heating, Ventilating & Foundry Co., Elm Grove, Wheeling, W. Va., will be sold Sept. 3 by the receiver.

Two departments of the Diamond State Steel Co.'s plant, Wilmington, Del., which had been idle for several weeks, resumed operations last week under the receivers.

Rod mills Nos. 1 and 2 of the Illinois Steel Co., Joliet, Ill., resumed Aug. 22, thus placing every department of the mills in operation with over 2,000 employes.

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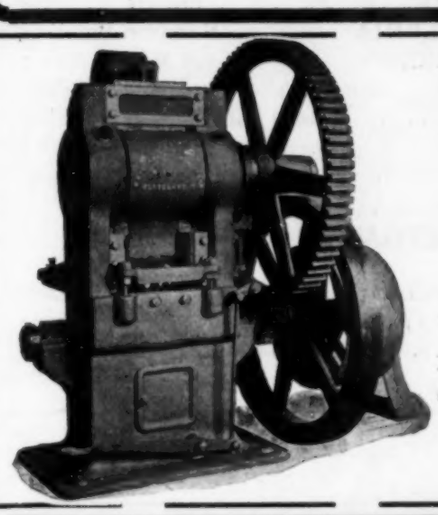

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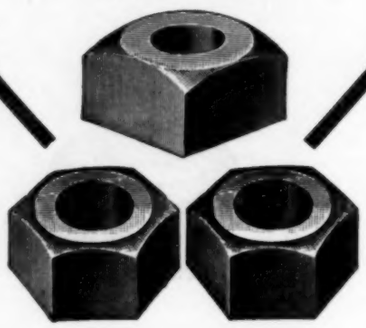

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